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J. W. PAGE

REVISED EDITION

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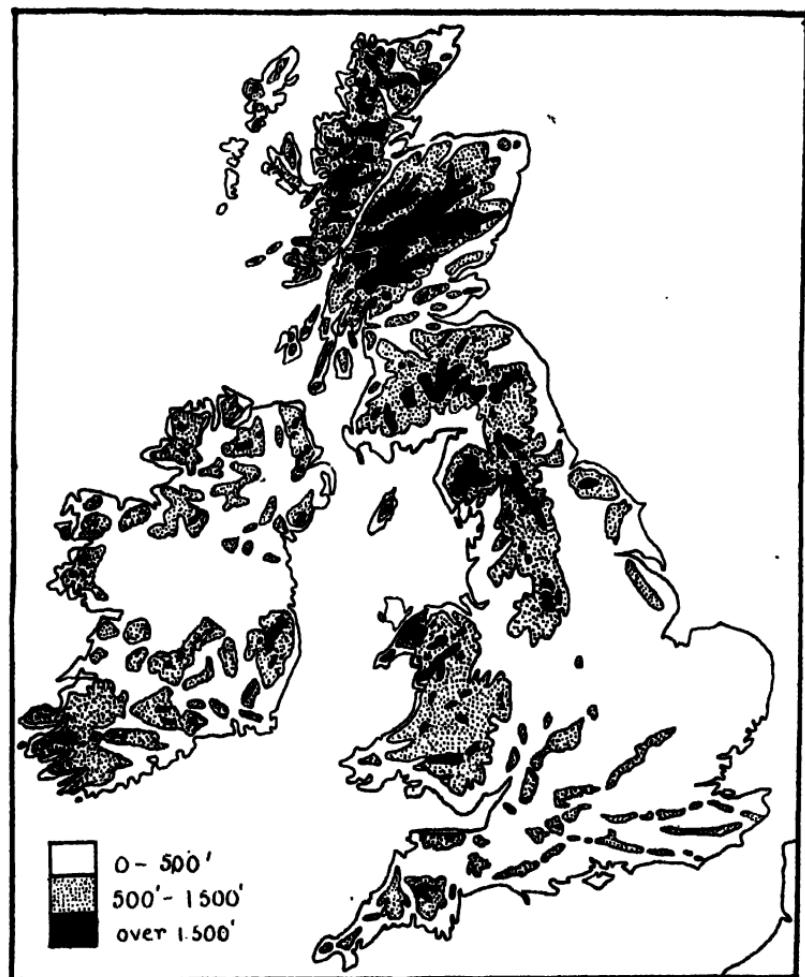
N.B.—In revising this book it has been considered inadvisable to alter many of the trade statistics, as conditions are still abnormal. *Whitaker's Almanack* or the *Statesman's Year Book* should be consulted for more recent figures.

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MAP I.—SURFACE FEATURES.

BRITISH ISLANDS

CHAPTER I

SURROUNDINGS

Exercises.

1. Measure the distance from C. Wrath to Land's End, and find the area of the islands by means of squared tracing paper.
2. On a blank map of the British Isles insert 50° N., 60° N., 0° and 10° W. [longitude; also show where the new coastline would be if the land were to rise 600 ft.] Name all the places mentioned in this chapter.

The British Islands consist of two large islands, Great Britain and Ireland, and about five thousand smaller ones. They have an area of 121,000 sq. miles, Great Britain being about 88,000 sq. miles and Ireland about 32,000 sq. miles.

The British Islands lie to the N.W. of Europe, being separated from the continent by the North Sea, St. of Dover, and the English Channel, all of which are shallow seas. In fact, the British Isles are on the continental shelf.¹ These shallow seas

¹ Islands that are situated on a continental shelf are called *continental islands*, and, as a rule, have the same fauna and flora as the neighbouring continents, whereas islands that are situated in the midst of deep seas are *oceanic islands*, are poor in fauna and flora, and are of volcanic or coral origin, as, e.g., the Polynesian Is., Ascension, St. Helena, etc.

It is believed that the British Islands in past ages formed part of the continent, and so man and beast were able to come over without the assistance of boats. The reasons for believing this are : (1) The seas are shallow, and as a result if the beds were to be raised 600 ft. all the five thousand islands, except the Outer Hebrides, would be joined to the continent. (2) The E. coast of Britain is similar to the west coast of continental Europe, e.g., there is chalk at Dover and chalk at Calais ; lowland round the Wash and lowland in Holland. (3) The west coast of Scotland is similar to the coast of Norway. (4) The Grampians are similar to the Scandinavian Mts. (5) Some of the glacial boulders found in Britain are of like kind to rocks found in Scandinavia. These were carried over by glaciers during the Glacial Period. (6) The animals of Britain are similar to the animals of the continent. (7) There has been dredged up from the bottom of the North Sea remains of mammoth and other animals which must have perished there when it was dry land.

are important to Britain because : (1) There are sand banks in them, some of which are breeding places for fish, notably the Dogger Bank, where the water is no where more than 100 ft. deep. This is the second most important fishing-bank in the world. (2) The shallowness of the water round the coasts causes the tides to be higher than they are in the deeper ocean, and, moreover, these tides are still higher in the narrow estuaries. This makes it possible for ships to get farther up the rivers than would be possible without this shallowness. The existence of the Dogger Bank has helped to make the countries bordering the North Sea nurturing places for fishermen.

Grimsby is the great fishing port of Britain. It is almost opposite the Dogger Bank, and is conveniently situated for obtaining ice and timber from the Baltic. The fish is sent by boat or by the Great Northern Railway to Billingsgate Fishmarket in London.

The fact that the United Kingdom is so near to, and yet is separated from, the continent of Europe, is a fact of paramount importance to these islands. The nearness enables this country to take part in continental trade, and the separation makes her less subject to the dangers of invasion and disease.

The British Islands fill roughly a rectangle of 10° of latitude and 10° of longitude ; 50° N. passes through the Lizard, and 60° N. through the Shetlands ; 10° W. passes through the far west of Ireland, while only a small portion of the British Islands (Norfolk, Suffolk, Essex, and Kent) are east of longitude 0° . In early times the British Islands were on the edge of the known world, travellers having been kept from exploring the Atlantic by the ice barrier of the north and the trade winds to the south ; the latter they knew would take them across the ocean, but would not bring them back.

Considering their size the British Islands are the most important area in the world. This is due to :—

1. *Position*, which makes it easy to trade with Europe and the rest of the world.
2. *Climate* which, being free from extremes, enables men to work in the fields at all seasons of the year.
3. *Geological structure*, which has brought valuable minerals to the surface, and has given a fertile soil.
4. *The skill and enterprise of the inhabitants*.

The Coast.—The British Islands have a very long coastline, owing to the large number of gulfs, peninsulas, and islands. As a result of this, no place is more than 70 miles from the coast, and this gives commercial and climatic advantages. Moreover, the nearness to the sea and the presence of good harbours, together with the fact that the seas surrounding the shores are

well stocked with fish, have made it easy for the inhabitants to become sailors. The Devonian peninsula, in particular, has produced some of the most renowned seamen that the world has known.

The importance of the coastline is increased by the numerous good harbours; moreover, the best harbours are so near together that they have been connected by canals, as, e.g., the Clyde and the Forth, the Mersey and the Humber, the Severn and the Thames. Milford Haven, in the west of Wales, is one of the finest natural harbours in the world, yet there is no great port on it. The same is true of the numerous openings in the west of Ireland, as, e.g., Tralee Bay, Dingle Bay, Kenmare River, Bantry Bay. This is due to their distance from the centres of population, and to the difficulties of communication.

The most important openings for commercial purposes are river mouths, because a river affords a ready means of communication inland. Some other openings are due to the softer rocks being washed away, while the harder rocks are left projecting as headlands. Land's End, Buchan Ness, and Carnsore Point are of granite, Flamborough Head and Beachy Head are the ends of chalk ridges, Cape Clear and Kinsale Head are of sandstone, while Gt. Orme's Head and Portland Bill are of limestone. Some of the capes, however, are low, and composed of sand or shingle that has been thrown up by the tide, e.g., Dungeness, Spurn Head.

The openings in the west of Scotland and Ireland are only to a small extent due to this action. The Scotch openings are fiords, that is, drowned river valleys, which have probably been deepened by glacial action, as, e.g., Loch Carron, Loch Linnhe, and Loch Fyne. Many of the openings in Ireland are *rias*, that is, they are drowned river valleys that get shallower towards the head. A fiord, on the other hand, is, as a rule, deeper inside than at its mouth.

The West of Scotland resembles Scandinavia, not only because of its fiords, but because it is skirted with islands. The Minch divides these islands into two groups called the Inner and Outer Hebrides. Skye, Mull, Jura, and Islay are the largest of the Inner islands, and Lewis is the most important of the Outer islands. Separated from North Scotland by the stormy Pentland Firth are the Orkneys, while farther north still are the Shetlands. All these islands once had Norse settlements. The Vikings called the most northerly point of the mainland Cape Wrath, which means the corner or turning point. The Isle of Man, lying in the midst of the Irish Sea, was also visited and settled on by the Norsemen. Anglesey lies to the north of Wales, from which it is separated by the Menai St. The Isle of Wight, separated

from the mainland by Spithead and the Solent, lies to the south of Hampshire. Achill Is., with its high cliffs, is the largest island off the coast of Ireland ; Valentia in the S.W. of Ireland, is famous because of its cable station ; Fastnet Is., near to Cape Clear, is a signalling station for liners.

CHAPTER II

SURFACE OF BRITISH ISLANDS

Exercises.

1. Draw a sketch map to show what the British Islands would look like if the land were to sink 600 ft.
2. Draw a section along 4° W.
3. On a blank map shade in all the land over 1,200 ft. above sea-level and insert and name the rivers.
4. On a contoured map insert the railways and notice how they follow the valleys.

A glance at a physical map will show you that the greater part of the high land is situated in Scotland, the north and west of England, and around the coasts of Ireland. In fact you can divide the surface into the following divisions : The highlands of Scotland, the lowlands, the southern uplands of Scotland, the Pennine Range, Cumbrian Mts., the Welsh Mts., the Devonian system, the English plain, the great plain of Ireland, and the Irish coastal mountains.

The **Scottish Highlands** are divided into two by a deep valley called Glenmore (the great valley), which runs from S.W. to N.E. In the bottom of this glen are Lochs Lochy, Oich, and Ness, which have been connected to form the Caledonian Canal. The old military forts, Fort William, Fort Augustus, and Fort George, recall the strategic value of this valley. Near to the N.E. entrance is Culloden Moor, where Prince Charles Edward, the Young Pretender, made his last stand (1745). The highlands to the north are known as the Northern Highlands, while those to the south are called the Grampian Highlands. They are a dissected plateau, and show many relics of glacial action. The water-parting in the North Highlands runs N. to S. Rising above the general level are Ben More (3,000 ft.), Ben Dearg (3,500 ft.), and Ben Attow (4,000 ft.). Some lakes in this district are of remarkable beauty, as, e.g., L. Maree, L. Shiel, and L. Morar.

The Grampian Highlands end southward in a steep wall almost parallel to Glenmore. Some of the best known peaks are Ben Nevis (4,400 ft.), Ben Macdhui (4,300 ft.), Ben Lomond (3,200 ft.), and Lochnagar. The Highlands form a great barrier

to communication north and south, and some of the rivers have made deep valleys.

The passage from the Tay to the Spey is the most easily passable. The Tay is followed, then its tributary, the Garry, and the divide is crossed by means of the Pass of Drumochter (1,500 ft.). The most difficult part of this route is the Pass of Killiecrankie, where the river flows through a narrow gorge. Here Claverhouse defeated King William III's force under General McKay in 1689. This route is followed by the Highland Railway from Perth to Inverness. The North British line from Glasgow to Mallaig, on the Sound of Sleat, passes by the Moor of Rannoch, near to which is the valley of Glencoe, notorious for the massacre of 1692.

The rivers draining this mountainous district are the Findhorn, Spey, Don, Dee, and Tay. The Tay (110 miles) receives the following tributaries—the Almond and Earn on the right, and the Lynn and Tummel on the left. The Tummel drains Lochs Ericht and Rannoch. The Earn drains Loch Earn, and Loch Tay is drained by the Tay. Loch Lomond is situated on the edge of the highlands. Loch Katrine is situated in the Trossachs—the beauty spot of Scotland.

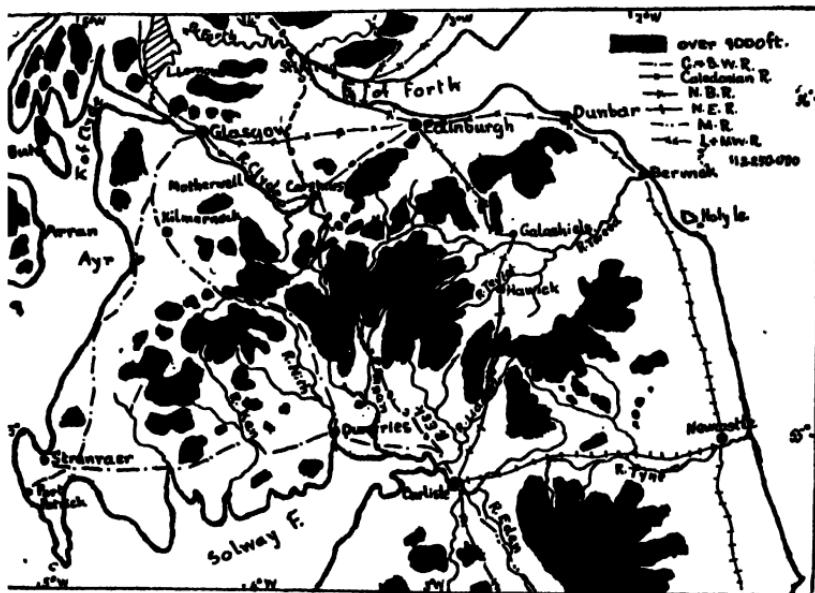
The **Lowlands** are a rift valley, that is, two parallel cracks or faults were formed running from S.W. to N.E., and the land between them has slowly subsided. The strata, in doing this, became folded, and a line of highlands was the result, running in the same direction from N.E. to S.W. These are the Sidlaw Hills, Ochill Hills, Campsie Fells, and Renfrew Heights. The rivers Tay, Forth, and Clyde flow between these, forming natural routes to the north. The valley between the edge of the Grampians and the Sidlaw Hills is known as Strathmore.

The **Southern Uplands** of Scotland are not as lofty as the Highlands, having an average height of about 1,000 ft. Cheviot (2,676 ft.) is the highest peak, and is snow-capped in winter and spring, and thus forms a good landmark to sailors. The vale of Tweed separates the Lowther Hills from the Cheviots, and north of the Lowther Hills are the Lammermuir, Moorfoot, and Pentland Hills, which come close to the North Sea and make the coastal plain narrow. This plain is followed by the North British Railway on its way from Berwick to Edinburgh, being the only possible route.

The **Moors of Galloway** are the western extension of the Southern Uplands. The Clyde makes a valley to the north of these uplands, while the Annan, Nith and Dee trench it in the south, the Nith flowing right through them. These valleys are utilized by the lines that run northward from Carlisle. The Caledonian Railway, which runs in connection with the London and North-

Western Railway, follows the valley of the Annan, crosses Beattock Summit (1,000 ft.), and descends into the valley of Clyde, and so to Edinburgh and Glasgow. The Glasgow and South-Western, which runs in connection with the Midland Railway, utilises the Nith valley to cross the upland barrier, and so through Kilmarnock to Glasgow, with a line to Stranraer. The Waverley route of the North British runs up Liddisdale to Riccarton, crosses the Teviot at Hawick, passes through Melrose and Galashiels into Tweeddale, then up the Gala and so to Edinburgh.

There is a plain, ten miles wide, to the east of the Cheviots,



MAP 2.—THE BORDER-RAILWAYS.

which hills practically form the boundary between England and Scotland. This plain can be crossed by the coast road, which crosses the Tweed bridge, or by following the valley of the Till to the Tweed near Coldstream, which is the lowest spot where the Tweed could be forded. It was in this eastern lowland district that most of the border battles¹ took place, as at the western end

¹ Battles.—*Eastern Side.* Hornildon Hill (1402), the Percies defeated the Scots; Flodden (1513), James IV defeated by the English under the Earl of Surrey; Preston Pans (1745), the English under General Cope cut up by the Highlanders under the Young Pretender. *Western Side.* Solway Moss (1542), James V defeated by the English.

there was a bog, which has now been drained, and which is crossed by the Liddel and Esk. At low water this bog could be forded, but the passage was dangerous owing to the rapid inrush of the sea.

The Southern Uplands are separated from the Pennine Range by the Tyne Gap, which is followed by Hadrian's Wall, and is used by the branch of the North-Eastern Railway that connects Newcastle with Carlisle.

The **Pennine Moors** run from north to south. They are almost divided into two masses by the Aire gap, which is utilized by the Midland Railway on its journey from Leeds to Carlisle. A ridge of high ground, called Shap Fell, connects the Pennines with the Cumbrian Mts., which are almost isolated by the deep valleys of the Eden and the Lune. Many of the peaks in the Pennines are over 2,000 ft., as, e.g., Cross Fell (2,900 ft.), Mickle Fell, Bow Fell, Whernside, Ingleborough, Penyghent, and The Peak. These mountains are high enough to affect the climate, and have been a great barrier to commerce and communication in days gone by. Nowadays the dense industrial populations to



DIAGRAM 3.—DIAGRAMMATIC SECTION ACROSS THE PENNINES.

the east and west have made it necessary to overcome these difficulties of communication, and consequently several railways ascend the valleys and tunnel through the highlands.

The nature of the scenery varies, according to the kind of rock that comes to the surface.

Thousands of years ago, there were laid down in this region layers of material that have now become what we call mountain limestone, millstone grit, clays, and flagstones, with occasional seams of coal. It took many centuries for these layers to be deposited, some being many thousand feet in thickness. Later, on account of great earth movements acting E. and W., the rock layers were bent into a huge fold, striking N. and S. for 200 miles. The bending of the strata in this way caused holes and cracks to be formed in the top of the arch, and as it became raised, the agencies of denudation acted on it, and much has been removed. The beds of coal which were continuous have been removed from the top, and divided into the Yorkshire and Lancashire coalfields. Later, new deposits of clays and sandstones, called by geologists New Red sandstone, were deposited on the flanks of this.

Where the millstone grit comes to the surface it forms plateaux of heathery moorland, over which huge stones, worn into peculiar shapes, are scattered, while basin-like valleys have steep rocky upper slopes, but gently curving

grassy floors. The limestone forms plateaux covered with grass, but, in places, there are perpendicular cliffs on the sides of hills, while the flat surface on the top is frequently seamed by numerous small fissures filled with ferns. The valleys are deep, and narrow ravines are numerous, and wherever water is found there also is plenty of vegetation; but sometimes the valleys are dry. As in all other limestone districts, there are swallow holes, caverns, caves, and underground streams in this district, due to the solubility of limestone by water having carbonic acid gas in solution. Some of the caves are of great size, notably those at Castleton in Derbyshire.

The **Cumbrian Mts.** are composed of hard igneous rocks in the south, which give rise to rough crags and almost inaccessible peaks, like Scafell (3,200 ft) and Helvellyn (3,050 ft.). In the north, the rocks are slaty, and the peaks have a soft rounded summit, like Skiddaw and Saddleback. A glance at the map will show you that the rivers and the ribbon-like lakes flow out in all directions (see Map 18). This district was once a great dome of rock, from which the rivers gradually carved out valleys, and so dissected the boss of rock. Later on, when the N. of England was covered with ice, some of these valleys were dammed with material brought down by glaciers, and, on the melting of the glaciers, ribbon-like lakes were formed. Some of these lakes have been divided into two by the mud brought down by the streams, as, e.g., Derwentwater and Bassenthwaite.

Ulleswater and Hawes Water are drained into the Eden. Windermere, the largest lake, Coniston Water, Grasmere, and Rydal Water drain into Morecambe Bay; the Greta, or Derwent, drains Thirlmere; and Derwentwater and Bassenthwaite are drained into the Irish Sea; Ennerdale Water and Wast Water also drain into the Irish Sea.

The **Cambrian Mountains** are separated from the Pennine Moors by a lowland district, across which flow the Dee and the Mersey. This lowland region leads to London, and was important in past times because it was the natural route to Ireland. The L. and N.W.R. crosses the Cheshire plain. At Crewe the line divides, one branch going N., via Preston to Carlisle, and another passing through Chester on the way to Holyhead for Ireland. Soon after leaving Rhyl the line is compelled to keep close to the coast because of the Welsh Mts.

This mass of mountains is composed of slate and granite, and forms a dissected plateau. The rivers, most of which run in beautiful deep valleys, naturally divide the mass into groups, and are the only means of communication inland.

The picturesque upper valley of the Dee divides the Berwyn Mts., from the mass of which Snowdon (3,500 ft.) is the culminating peak. The northern group is again divided into

two by the valley of the Conway, in which stands Bettws y Coed, noted for its scenery.

The Snowdon range consists of igneous rocks, and stretches towards Braich y Pwll in the Lleyn peninsula. Snowdon itself is far below the snow-line, although snow lies on it in patches during the winter, and small patches of snow have been found in sheltered places even in July. Cader Idris and Plynlimmon (2,470 ft.) are other important peaks.

The Severn, rising in Plynlimmon, flows N.E. towards the lowlands of the English borders, and divides the lower southern division from the higher north.

The most impressive ranges in the south are the Black Mts., which include the Brecon Beacons, and in which rise the Ush, Taff, Neath, and Tawe. The Wye rises farther north.

The Devonian System.—The high ground in the S.W. peninsula forms three groups : Exmoor in North Devon, the granite mass of Dartmoor in South Devon, and the Cornish heights.

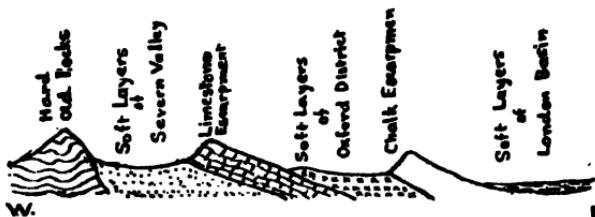


DIAGRAM 4.—DIAGRAMMATIC SECTION ACROSS EAST ENGLAND.

The English Plain.—S.E. England is composed of newer rocks, which dip towards the east, so that in passing from W. to E. you come to more recent rocks. The higher ground here is found where the agencies of the weather have worn away the softer rocks, leaving the harder rocks as bold escarpments, facing westward, with a gradual slope parallel to the dip of the rocks towards the east.

One of these escarpments, which runs roughly from S.W. to N.E., is of limestone, and the other is of chalk. The limestone escarpment includes the Cotswold Hills and the Yorkshire Moors, while the chalk escarpment includes the Chiltern Hills, East Anglian Heights, Lincoln and Yorkshire Wolds, terminating in a chalk cliff at Flamborough Head. To the south of the Thames the chalk escarpments of the N. and S. Downs have an E. and W. direction. In several places there are gaps in these hills, made by rivers, and these gaps are now followed by railways on their way southwards (cf. Map 21).

The Mendip Hills and Quantock Hills in Somersetshire run from N.W. to S.E.

The Surface of Ireland.—The chief feature of Ireland is the Central Plain, which occupies the greater part of the interior, and reaches the coast on the E. at Dublin and on the W. at Galway. Most of this is composed of porous limestone ; this has been worn into hollows, in which lakes have been formed. Caves are common, and so are underground streams. The rivers flow sluggishly across the plain, and as a great amount of the water drains into the centre, the water accumulates, especially in those parts where the limestone is covered with boulder clay. Thus a marshy surface is created in which grow moss, ferns, and heath. This forms what is called a bog.

Bogs have a monotonous appearance, owing to the absence of trees and clear running water. There are few animals, and the population is small. Where the bogs have been drained and the peat has been cut, the soil is productive.

The Shannon (225 miles) flows across the plain in the west, and the Boyne and Liffey drain the east.

The ridges in S.W. Ireland run from E. to W. There are many of them, but the most important are the Kerry Mts., the chief ridge of which is the Macgillicuddy's Reeks, with Carnlual (3,400 ft.) which overlooks the three lakes of Killarney. In the far west the valleys between these ridges have become drowned, forming *rias*. The rivers Bandon, Lee, and Blackwater all run from W. to E. in their upper courses, then they break through the ridge at right angles, and empty their waters into the almost landlocked harbours of Kinsale, Cork, and Youghal respectively. The Knockmealdown Mts. and the Galtee Mts. also run W. to E.

The river Suir first flows from N. to S., is then turned to the east by the Knockmealdown Mts., and empties its waters into Waterford Harbour. The Barrow, with its tributary, the Nore, which rise in the Slieve Bloom Mts. in the centre of Ireland, also flows into Waterford Harbour. The Slaney rises in the Wicklow Mts., and empties its waters into Wexford Harbour. There are many beautiful valleys in the Wicklow Mts., the most renowned of which are the Vales of Avoca and Glendalough.

The mountains of North Ireland are not arranged in such well marked ridges as those in the south of the island, but the mountains are older and more rugged, except the Antrim Mountains, which are of recent volcanic rock.

The mountains of Connaught are separated from the lowlands by the river Moy in the north and Loughs Corrib and Mask in the south, while Clew Bay divides the highlands into Nephin

Beg Mts. to the north and the Mts. of Connemara to the south. The highlands in many places come close to the coast, and give rise to magnificent coastal scenery. The cliffs in Achill Is. are 2,000 ft. high.

The Donegal Highlands lie to the north of the river Erne, which drains Lower and Upper L. Erne. They consist of parallel ridges, and are almost treeless, with bogs in many places. Errigal (2,400 ft.) is the highest peak, and Slieve League rises 1,900 ft. sheer from the sea.

The highlands of the north-east of Ireland are divided into four masses by river valleys. In the centre of this district is Lough Neagh, the largest lake in the British Islands.

The lowland district of the north-east of Ireland that runs from north to south is drained in the south into Carlingford Lough, while the north is drained by the Bann, which flows through Lough Neagh. The east to west strip of lowland is drained in the west by the Blackwater into L. Neagh, and the Lagan, which flows into Belfast Lough. The Sperrin Mts. fill the N.W. corner, and the Heights of Armagh the S.W. corner. Both of these are old worn down mountains. The Antrim Mts. fill the N.E. area, and the granite mass of the Mourne Mts. lie to the S.E., the highest peak being Slieve Donard (2,800 ft.). The valleys are used by railways and canals.

The Ulster Canal connects the Blackwater with the Erne, and the Newry Canal connects the Bann with Carlingford Lough. The Great Northern Railway of Ireland also utilizes these valleys on its way to Belfast and the northern counties. The river Foyle separates the Mts. of Donegal from the Sperrin Mts.

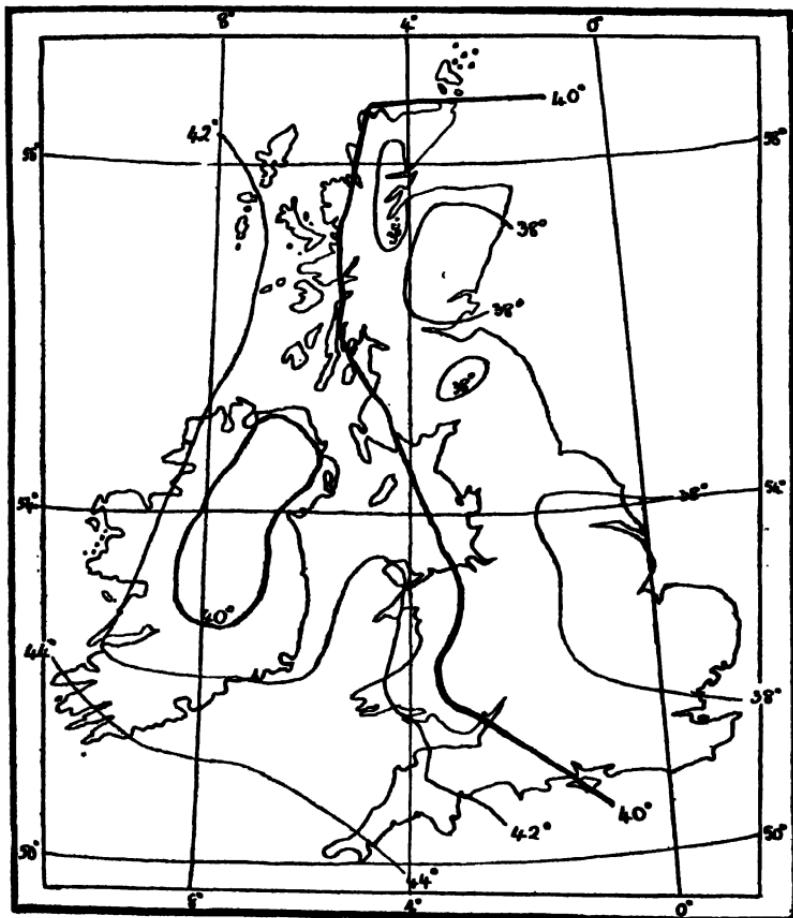
CHAPTER III

CLIMATE OF THE BRITISH ISLANDS

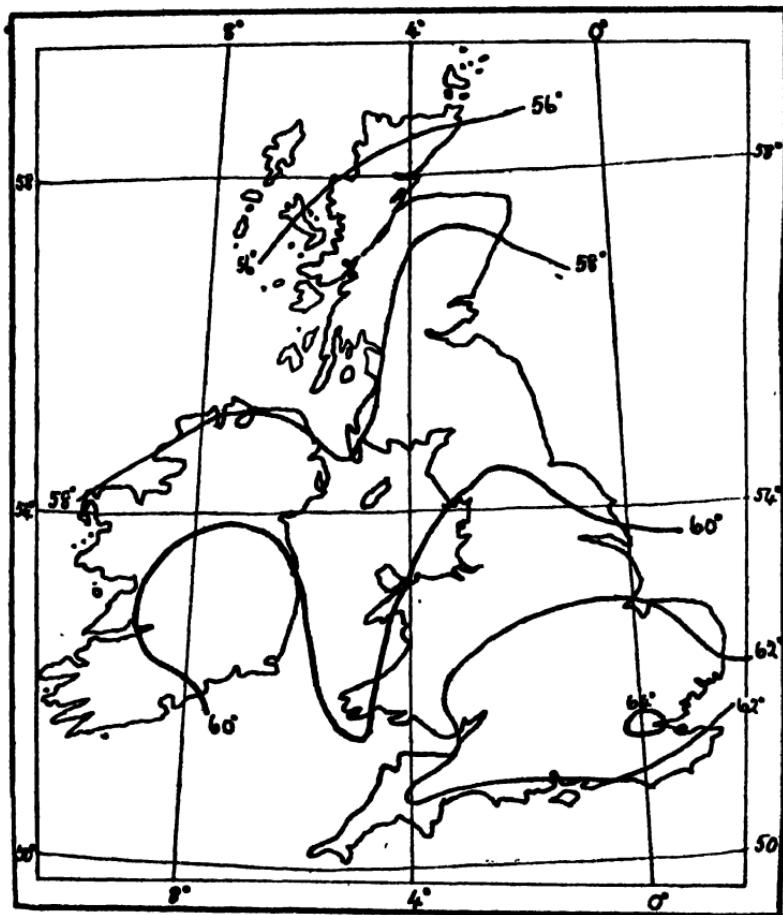
Exercises.

1. Trace the isothermal lines for June (in black) and July (in red) on the same map and shade in the area that has the greatest range of temperature.
2. Plot temperature curves for the following places in pairs :-

	Ft. William.	Ben Nevis	Oxford	Pembroke.	London.	Stornoway
January	...	39°	25°	38°	42°	38°
February	...	39°	24°	40°	43°	40°
March	...	39°	23°	42°	43°	42°
April	...	45°	27°	47°	47°	49°
May	...	50°	34°	52°	50°	54°
June	...	55°	39°	59°	56°	61°
July	...	56°	40°	61°	59°	64°
August	...	55°	39°	61°	59°	63°
September	...	54°	38°	57°	57°	54°
October	...	47°	32°	49°	52°	50°
November	...	42°	28°	43°	47°	43°
December	...	38°	24°	39°	43°	39°



MAP 5.—DISTRIBUTION OF TEMPERATURE (JANUARY) REDUCED
TO SEA-LEVEL.



MAP 6.—DISTRIBUTION OF TEMPERATURE (JULY) REDUCED
TO SEA-LEVEL.

3. Fort William (10 ft. above sea-level) and Ben Nevis (4,400 ft. above sea-level) are almost on the same latitude. In what way is the temperature affected by altitude? Calculate the mean annual temperature of each, and find what difference in altitude produces a difference of 1° in temperature. During what months is there likely to be snow on the top of Ben Nevis?

4. Oxford and Pembroke are practically in the same latitude. Find the range of temperature of each place? Which place has the greatest range, and how is it situated as regards the sea?

5. Stornoway is roughly 7° N. of London. Which is the warmer in December and January, and what is the range of temperature of each place?

6. Make wind roses for the places in the following table, which gives the average percentages of the direction of winds during the year:—

	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Calm.
Glasgow	...	3	15	13	4	9	18	15	3 20
Dublin	...	5	6	11	9	8	13	28	12 8
Greenwich	...	11	12	10	6	11	28	15	5 2
Cork	...	15	9	9	7	10	14	21	13 2

What general statement can you make as regards the predominant direction of the wind in the British Isles?

7. Plot rainfall curves from the following:—

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
London	...	1.8	1.6	1.6	1.7	1.7	2.2	2.4	2.4	2.0	2.7	2.3 2.0
Liverpool	...	2.1	1.7	1.8	1.6	1.9	2.2	2.9	3.0	3.0	3.5	2.7 2.5
Seathwaite	...	13.4	11.0	10.6	6.9	7.5	6.9	8.9	11.5	11.3	12.7	13.6 15.0
Clacton-on-Sea	1.0	1.0	1.5	1.4	1.7	2.2	1.7	2.1	1.2	1.7	1.6	1.3

Calculate the mean annual rainfall of each place. Which has the most and which the least rainfall? and account for the differences.

8. From the Daily Weather Report trace, by means of maps, the path of a cyclone and of an anti-cyclone across our islands.

The British Islands lie between 50° N. and 60° N., therefore we know that they will have: (1) A temperate climate. (2) The west wind will be the predominant wind. (3) The climate will be influenced by the passage of cyclones and anticyclones across the islands. As there is no place more than 70 miles from the sea, the climate will nowhere be extreme, although there is a slight difference between the temperature of inland and coastal places (see Exercise 2).

The isothermals in the temperature map for January run almost from N. to S., while in July they run almost from W. to E. with the highest temperature in the neighbourhood of London. Thus we see that in January the N.W. of Scotland is warmer than London. This is also seen in the temperature curves of London and Stornoway.

The S.W. wind, which we see from the tables in Exercise 6 is the most frequent wind, comes from the ocean, which in winter is warmer than the land. Therefore it will raise the temperature of the lands it meets first. Moreover, the constant blowing

of this wind has helped to drive the waters of the ocean in the same direction, thus we have a drift current from the S.W., which also helps to increase the temperature of the west during the winter months.

• During the summer months the land is warmer than the open ocean, thus the west is cooled rather than warmed, and the distribution of temperature during these months is chiefly controlled by latitude.

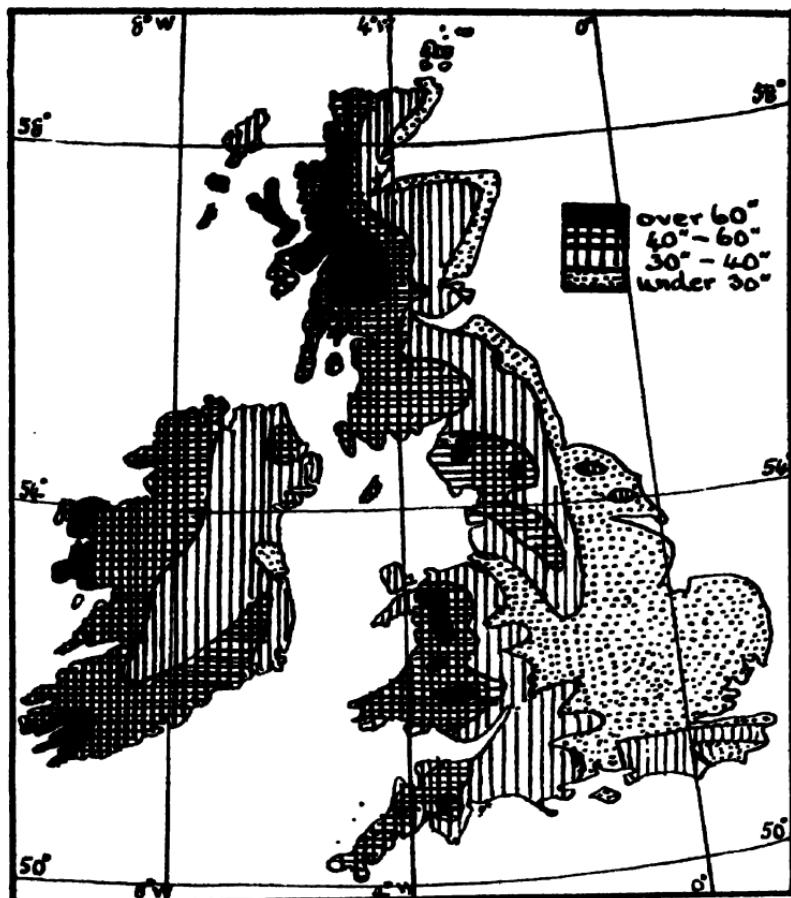
The rainfall map shows that the heaviest rainfall is in the west. This is what we should expect, as the W. wind, which is the prevalent wind, comes from the Atlantic Ocean, and therefore brings clouds. These clouds are forced up by the highlands of the west and so are cooled. Nevertheless, a great amount of rain that falls in our island is the result of cyclones.¹

Because the heaviest rainfall is in the west and the least in

¹ *Cyclones*.—A cyclone, or a depression, is a portion of the atmosphere in which the pressure is lowest in the centre and increases uniformly in all directions. It is an eddy of ascending air. The pressure gradient is steeper in the rear, and the isobars, or lines of equal pressure, are in consequence closer together, as shown in the diagram. The whole eddy moves across the country and the weather changes as it passes. As there is low pressure in the centre, air should come in from all directions radially, but, owing to the rotation of the earth, all winds are twisted, and so the winds almost follow the isobars, only making a small angle with them. The air thus moves in to the centre spirally, and consequently there must be a continual rising of air at the centre. This ascending air will take moisture with it which cools, condenses, and forms clouds which descend as rain.

In the Northern hemisphere the air seems to circulate spirally *anticlockwise*, and in the Southern hemisphere *clockwise*. If you draw on a piece of tracing paper diagram 8, then pass it slowly over a place on your map you will notice that the barometer should fall slowly, the wind should vary, and after the storm passes the barometer should rise rapidly. This is just what happens. The sky becomes gloomy on the approach of a storm, thick clouds form, and the air feels warm ; rain begins to fall, but is heaviest a little to the left of the path of the cyclone ; then the sky begins to clear, the air freshens, and the wind becomes stronger, often squally, as you would expect from the closeness of the isobars. So you see, there is some truth in the sayings, "A sudden fall in the barometer denotes a storm," and "The wind is the clearing up of the storm." The amount of rain that falls on account of a cyclone has no dependence upon the height of the land above sea-level. The rain that falls may alter the distribution for a month, but hardly affects the annual distribution.

An *anticyclone* is the reverse of a cyclone ; it is an area of high pressure at the centre diminishing to an area of low pressure. The air moves out spirally, *clockwise* in the Northern and *anticlockwise* in the Southern hemisphere. The surface winds are generally slight, and, as the air is descending from above in the centre of the system, it contains little water vapour, and so no clouds are formed. Thus in summer when an anticyclone is passing over our islands there is every chance of fine, clear, calm weather, although there may be a haze at night. In winter it means a frost, as the cloudless sky allows radiation to take place rapidly, and so the temperature of the earth falls quickly.



MAP 7.—MEAN ANNUAL RAINFALL.

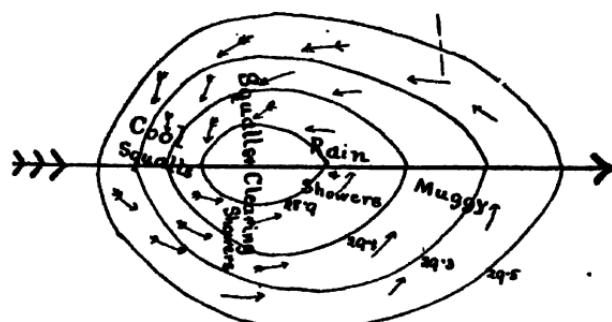
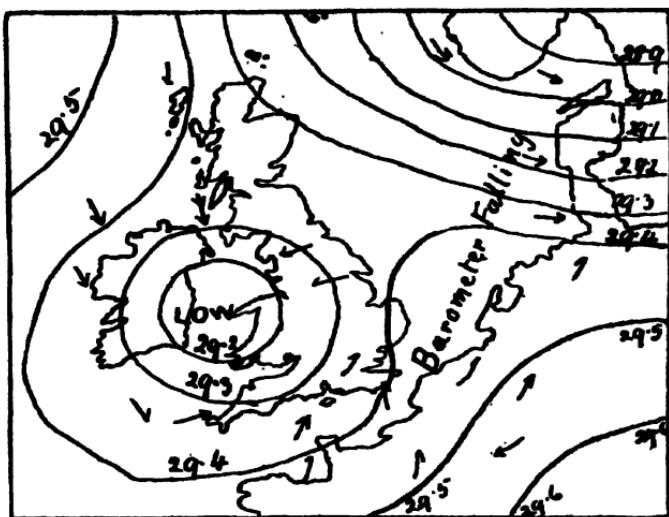
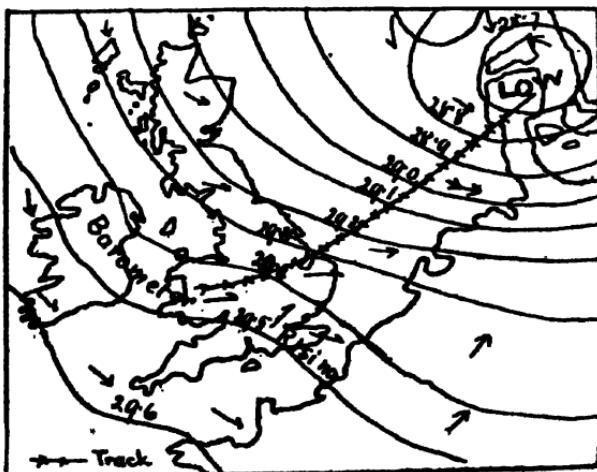


DIAGRAM 8.—DIAGRAM OF A CYCLONE.



MAP 9.—ISOBARS, ETC., AT 7 A.M. ON DECEMBER 19, 1910.



MAP 10.—ISOBARS, ETC., AT 7 A.M. ON DECEMBER 20, 1910.

the east, consequently with a corresponding greater amount of sunshine, wheat and fruit grow best in the eastern counties, and the manufacture of cotton fabrics, which require moisture in the air, is restricted to the damper western slope of the Pennine Range.

CHAPTER IV

PRODUCTIONS

Exercises.—I.

Divisions.	Total Surface excluding Water.	Woods and Plantations.	Mountains and Heath.	Permanent Pasture.	Arable Land.
England	32,400,000	1,700,000	2,616,000	12,798,000	11,470,000
Wales	4,750,000	187,000	1,371,000	1,791,000	935,000
Scotland	19,070,000	852,000	9,134,000	1,308,000	3,453,000
Ireland	20,247,000	206,000	8	9,121,000	5,272,000
Isle of Man	141,000	1,400	28,000	18,000	74,000
Channel Islands	44,000	200	2,400	10,000	23,000
Total	76,652,000	2,946,600	13,151,400	25,046,000	21,227,000

* Corresponding figures not available.

Find what fraction each is of the total for each country and for the United Kingdom, and represent graphically.

2. In 1917 the animals in the United Kingdom were :—

	Great Britain.	Ireland.
Horses	1,281,855	597,692
Cattle	7,474,770	4,907,466
Sheep	24,122,791	3,744,453
Pigs	2,060,344	947,572

Which portion of the British Isles has more cattle than sheep, and how do you account for it ?

3. Represent graphically the ploughed land in Britain, showing what proportion is given up to each (numbers are in 1,000 acres) : Wheat, 2,370 ; barley, 1,870 ; oats, 5,100 ; beans, 315 ; peas, 184 ; potatoes, 1,200 ; turnips and swedes, 1,560.

The greater part of our islands was in ancient times covered with forests and marsh, but most of the forest land has been cleared, either to make room for the pursuit of agriculture or to provide charcoal for the smelting of iron ore. Especially was this the case in the Weald. Many of the marshes have been drained. To-day not much more than four per cent. of the surface is woodland, and all that remains of this once vast forest land is the New Forest (400 sq. miles), the Forest of Dean (150 sq. miles), Sherwood Forest, and Epping Forest. The birch and Scotch fir are the chief trees that grow in the colder north, while

deciduous trees grow in the south. The beech is the most exacting, and is almost absent from Scotland.

The vegetation depends upon the soil and the climate. Maps like those in this book can be constructed from the Board of Agriculture returns to show the distribution of the various products. The largest area is given up to grassland. The greater part of the land in Ireland is under pasture. This is partly due to the heavy rainfall. The pasture is rich and green, which accounts for Ireland being called the "Emerald Isle." As a result, Ireland produces great quantities of dairy produce. A little more than a quarter of Great Britain is under grass or clover. This forms pasture for numerous animals. There are more sheep than cattle in most places, except in Ireland and Cheshire.

Cereals, roots, and vegetables are the chief plants cultivated. Just over 9,000,000 acres of the plough lands are under corn, and five-ninths of this is given up to oats. The amount of land given up to grain has been decreasing since the repeal of the Corn Laws, and was still on the decline until the war, when attempts were made to increase it.

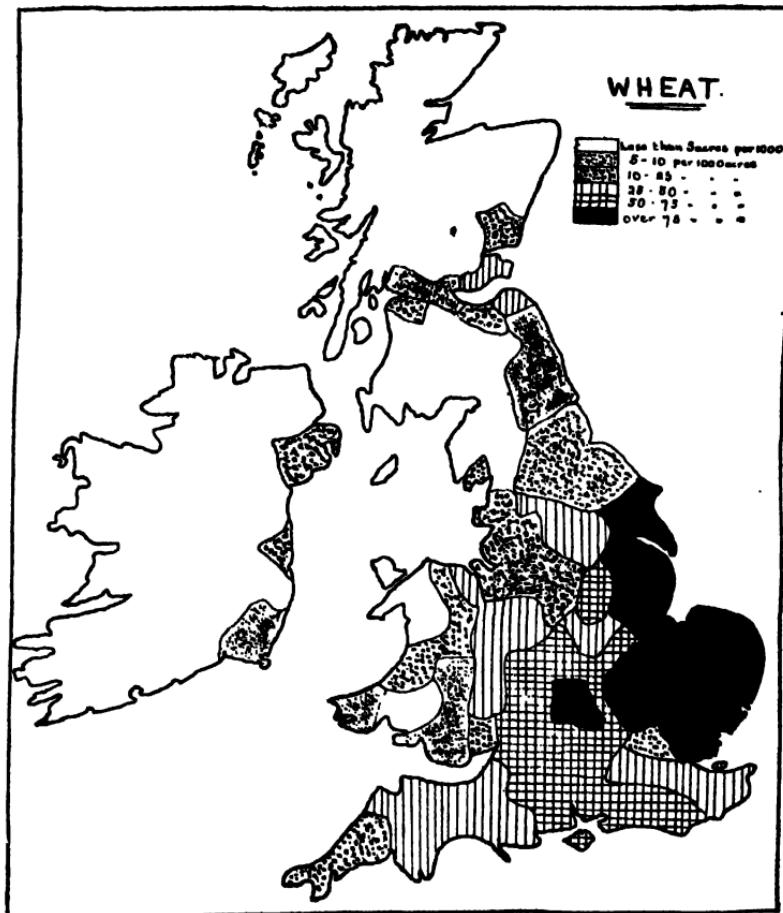
The reason for the decline was that foreign wheat became so cheap that the English farmer could not compete favourably with it.

Cereals.—Wheat grows best in the Eastern counties and in the Thames basin. This is because this district does not have too much rain, but has plenty of sunshine during the summer months ; besides, the soil in most places is clayey, and has been churned up during the ice age. The yield per acre is greater in Britain than in any other country, being 33 bushels per acre. This is the result of scientific farming brought about by competition. Barley is harder than wheat and will grow in most parts of Britain, but is chiefly cultivated in the Midland counties of England, especially the valley of the Trent, where it has given rise to breweries at Burton-on-Trent, and in the valleys of Scotland, where the malt is used for the distilling of whisky. Oats can flourish in the colder and damper regions. It is thus grown in Ireland and Scotland. Rye is only grown for fodder in the United Kingdom, while maize is grown only as a vegetable in the south-east of England, because there is not sufficient sunshine to ripen it.

Roots and Vegetables.—Potatoes and turnips are the chief root crops, but attempts are being made to cultivate the sugar-beet in places. The potato is the most valuable of Irish crops, while turnips are grown in largest quantities in Scotland (Banffshire) and in Norfolk and Suffolk. Peas and beans are cultivated in largest quantities in Lincolnshire and Suffolk ; and hops are grown in Kent, Surrey, Worcester, and Hereford.

Near all large towns land is given up to producing roots and vegetables for the local market. This is called "market gardening."

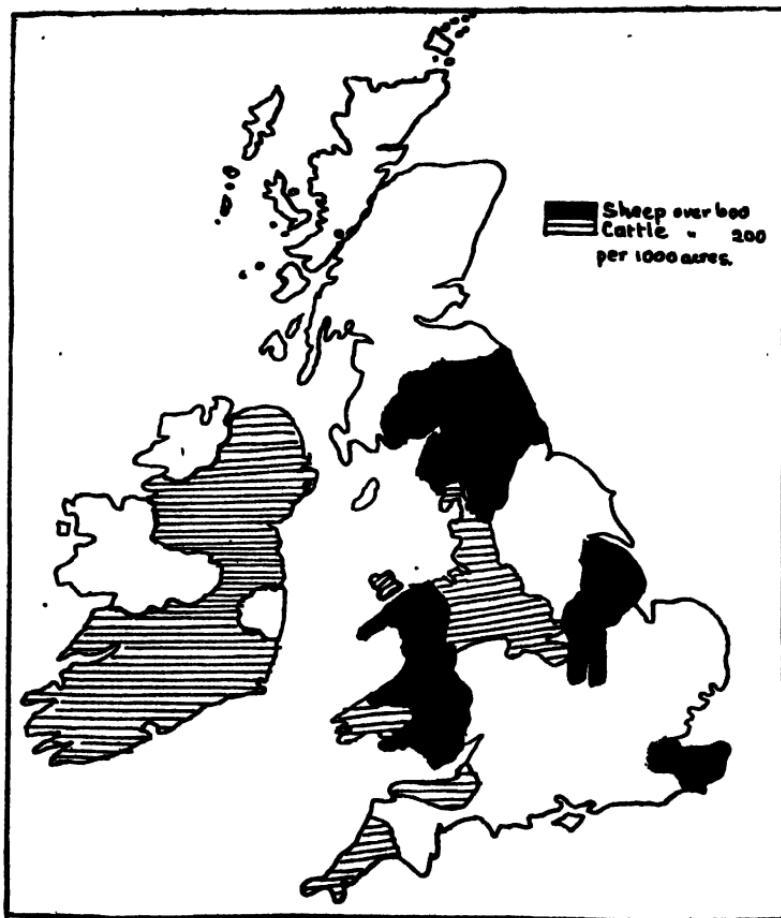
Fruits.—The hardier fruits are grown in Britain; apples and pears in the Severn Valley, and in consequence we have Devon-



MAP II.—DISTRIBUTION OF WHEAT.

shire and Herefordshire cider and Worcester perry. The chief region for the soft fruits, cherries, plums, and small berries, is in the drier S.E. of England, especially in what are known as the "Home Counties." Kent is often called "the orchard of England."

This great production of fruit led to the rise of jam-making in London, in the same way as the orchards in the fertile Carse o' Gowrie, led to jam-making in Dundee, which has been followed by the making of marmalade with imported oranges.



MAP 12.—CATTLE AND SHEEP.

Animals.—Few wild animals are left in Britain, but deer are still to be found on Exmoor, the Scotch Highlands, etc., and the fox, rabbit, etc., are fairly general. Man in place of these rears large numbers of cattle, sheep, horses, and pigs. The map showing the distribution of cattle and sheep indicates that the

sheep are reared on the drier hills, the cattle, especially milch cows, being kept on the damper lowlands. When sheep are reared in damp regions they give poor wool, but provide the best mutton, as, *e.g.*, Welsh mutton. The large number of cattle reared in the Midland counties has given rise to tanneries at Stafford, Leicester, and Northampton. The leather industry of Bermondsey (London) depends chiefly upon the skins of imported animals. Horses are reared everywhere, but the best hunters come from Ireland, while the dales of Yorkshire and Clydesdale produce the best animals for draught purposes. Pigs are, comparatively speaking, most common in Ireland, but they are also reared in the Pennine valleys and in the Thames basin.

The **Fishing Industry** of the British Isles is the most important of the kind in Europe, and Billingsgate, in London, is the largest fish market in the world. The chief centres are on the North Sea coast, which is near to the Dogger Bank, where all kinds of flat fish are caught, besides cod, herrings, and haddock. The herring fishery commences in April at Stornoway in Skye, and the centre of the fishery follows the migration of the herrings round the coasts of N. Britain, ending at Yarmouth in November. Mackerel are caught in the English Channel, pilchards off the coast of Cornwall, and salmon in the Eden, Severn, Tees, and the rivers of Ireland and Scotland.

Shrimps are caught in largest numbers where there are wide stretches of sand, *e.g.* in the Wash; oysters do best in the sheltered positions of estuaries, as at Whitstable on the Thames, and the estuary of the Stour. The largest quantities of mussels are collected in the Firth of Forth.

The chief fishing towns are Wick and Peterhead, in Scotland; Grimsby, Hull, Lowestoft, and Yarmouth, in England; and Dublin and Kinsale, in Ireland.

CHAPTER V

PRODUCTIONS (*continued*)

MINERALS

Exercises.

1. The estimated annual world production of coal is 1,000 million tons, which is produced as follows (in million tons): U.S.A., 447; U.K., 265; Germany, 161; France, 37; Belgium, 23. Represent this graphically. What fraction of the total is produced in the British Isles?

2. Plot curves from the following statistics to show change in amount of coal produced in U.S.A., Germany, and the United Kingdom.

	1860.	1870.	1880.	1890.	1900.	1910.
United Kingdom	...	80	110	146	180	222
United States	...	15	32	68	140	240
Germany	...	—	—	58	88	138



MAP 13.—COALFIELDS, SHOWING INDUSTRIES CARRIED ON, AND PORTS.

3. The estimated annual world production of iron is 90 million tons, which is produced as follows: U.S.A., 25; Germany, 15; United Kingdom, 15; Russia, 5·5; Spain, 8; Sweden, 4; Austria, 3·5; France, 4·8. Represent graphically, and find what fraction of the total is produced in the British Isles.

4. Plot curves from the following statistics to show the change in the amount of steel produced in U.S.A., Germany, and the United Kingdom.

	1876-80.	1881-85.	1886-90.	1891-95.	1896-1900.	1901-10.
U.S.A. ...	0·7	1·6	3·2	4·5	8·5	15
Germany ...	0·5	1·0	1·8	2·8	5·6	8
United Kingdom 1·0	1·9	3·2	3·1	4·6	6	

5. The following table shows the value of some of the minerals produced in the United Kingdom in million pounds (1914):—

Coal	...	...	...	...	...	132·51
Iron	...	...	...	...	...	3·9
Lead	...	...	...	...	...	0·4
Tin	...	...	...	...	...	0·8
Copper	...	...	...	...	...	9·02
Zinc	...	...	...	...	...	0·15
Silver	...	...	...	...	...	0·02
Total value						137·8

What fraction of the total are coal and iron? Represent graphically.

Look at the map on page 357, and you will see that all the coalfields lie north of a line joining the Exe with the Humber. This is because south of that line the rocks are of quite recent formation, whereas minerals exist in veins only in the older rocks. It is therefore only at great depths that they can be obtained in the South of England, e.g., coal is now being mined at Dover, but it is raised from beneath the chalk. Gt. Britain is very rich in minerals, especially in coal and iron. For many years Gt. Britain produced more coal and iron than any other country in the world, but now she has been beaten by the United States.

Ireland has practically no coal, peat being burnt instead. The coal that is used is imported. Coal is mined in the lowlands of Scotland, where there are three coalfields:—

	Coalfield.	Use Made of Coal.
1	Ayrshire	1. Exported to Ireland from Ayr, Ardrossan, and Troon 2. Used in Kilmarnock factories
2	Lanarkshire	1. Smelting iron and in the iron works 2. Used in shipbuilding yards on the Clyde bank 3. Used in the woollen mills of Tweeddale 4. Used in the cotton mills of Glasgow, Paisley, etc.
3	Fifeshire	1. Used in the linen mills of Dundee, Arbroath, Montrose, etc. 2. Exported via Burntisland and Methil

The English coalfields are :—

	Coalfield.	Use Made of Coal.	Output Average.
4	Northern	1. Exported to Scandinavia and to London 2. Used in iron and engineering works of Newcastle and neighbourhood 3. Used in shipbuilding yards of Tyne and Wear	Tons. 54,000,000
5	Cumberland	1. Exported to Ireland 2. Sent to iron works of Furness	8,000,000
6	York, Derby, and Nottingham	1. A little exported via Goole 2. Used in iron district of S. Yorks 3. Used in woollen mills of W. Yorkshire 4. Used in lace mills of Nottingham	67,800,000
7	S. Lancashire	1. Little exported 2. Used in cotton mills of the district 3. For ships that leave Liverpool	24,000,000
8	N. and S. Staffordshire ...	1. Sent to London 2. Used in the pottery works of the N. and in the iron works of the S. of the county	14,000,000
9	South Wales	1. A large quantity exported, especially anthracite 2. Used in iron and copper foundries	39,000,000

There are also smaller coalfields in Gloucestershire (Bristol and the Forest of Dean), in Cheshire, Shropshire, and Flint.

The chief ports engaged in the export of coal with the value of their export (1918) in million pounds are: Cardiff, 16; Tyne ports, 10; Newport, 4·7; Swansea, 4·4; Blyth, 3·4; Sunderland, 2·4; Hull, 2·0; Methil, 1·4; Glasgow, 1·8.

Iron ore is found on most of the coalfields and in the Cleveland district of N. Yorkshire, Furness, and Northamptonshire.

Tin is mined in Devon and Cornwall, but the mines are almost

exhausted, Britain depending almost entirely on foreign supplies of tin, which come principally from the Malay district and from Australia and Colombia.

Lead is mined in Derbyshire, Isle of Man, Lowther Hills, Wicklow, and in the neighbourhood of Cross Fell.

Zinc is mined in Denbighshire, Cardiganshire, I. of Man, and the Slieve Bloom Mts. in Ireland.

Oil shale is found in Fifeshire and Linlithgow, and has given rise to a paraffin industry at Bathgate.

Many kinds of rock are quarried for building purposes.

Granite : Aberdeenshire, Argyllshire, Cumberland, Dartmoor.

Marble : Derbyshire, Devonshire, Aberdeen, Cumberland, and Wicklow.

Limestone : Portland and Bath.

Slates : N. Wales, Cumberland, Perth, Argyllshire, and Westmorland.

Silica is found almost everywhere, and when near salt and coal is used in the chemical industry. Salt is mined in the valley of the Weaver in Cheshire, and in Cleveland, N. Yorkshire.

Clay for brickmaking is found in the Thames basin and elsewhere, while China Clay is obtained in Devonshire, Cornwall, and round Poole, in Dorset. Large quantities were once found in the valley of the Trent, but these have been exhausted, so that the Potteries (Staffs) now depend upon supplies from other parts.

CHAPTER VI

INDUSTRIES. I

Exercises.

1. The value of cotton, woollen, and linen yarns and goods produced is roughly, in million pounds : Cotton, 120 ; woollen, 55 ; linen, 25. Make a diagram to show this graphically.

2. The countries producing cotton are : U.S.A., 2·9 ; India, 0·8 ; Egypt, 0·4 ; China, 0·3 ; other countries, 0·4 (numbers are million tons). Mark these countries on an outline map of the world. Find what fraction of the total is produced in the U.S.A.

3. The source of the British supplies of cotton are (in £1,000,000) : U.S.A., 49 ; Egypt, 17·5 ; India, 2·4 ; Brazil, 0·9 ; Peru, 0·7 ; other British Possessions, 0·4. Total, 71. Mark arrow-heads on the map of the world used in last exercise to show these. Which country sends the most, and what percentage comes from it ?

4. Draw a sketch map to show the position of the cotton towns in South Lancashire.

5. The figures below give the wool crop for those countries in million lbs. : Austria, 602 ; New Zealand, 194 ; British South Africa, 51 ; Argentine, 380 ; Russian Empire, 420 ; U.S.A., 288 ; India, 54 ; United Kingdom, 142. Mark on the map of the world which three countries produce the most, and what fraction of the total do they produce.

6. The source of the British supplies of wool in million lbs. (average amount): Home, 136; Australia, 318; New Zealand, 181; British South Africa, 103; India, 54; Argentine, 42. Total, 1,000. Mark arrow-heads on the map of the world used in Exercise 5 to show these. Which country sends the most, and what fraction of the total does it supply?

• Practically no manufactures were carried on in our islands during the Middle Ages, the raw wool in those days being exported to Flanders to be manufactured there. The settlements of Flemish weavers and of Huguenots in this country led to the weaving being carried on at home. The looms in those days were worked by hand, and all the work was done in the peasants' houses. The great inventions of the 18th century that led to the Industrial Revolution and the introduction of steam power, caused the factories to be erected on or near the coalfields. This cheapened the cost of production by saving the expense of bringing the coal from a distance. The manufacture of woollen goods is the oldest of our industries, but by far the most important to-day is the manufacture of cotton goods.

Textile fabrics are woven from cotton, wool, silk, flax, and other fibres. Wool and silk are animal products, and being bad conductors of heat are suitable for temperate and cold lands, while cotton and flax, being vegetable fibres, are suitable for export to our vast tropical dependencies.

Cotton Industry.

Cotton is a sub-tropical plant, and grows well where the mean annual temperature is about 70° , provided the range is not too great, and the rainfall not too heavy. It requires plenty of sunshine rather than excessive temperature, and a dry harvest-time. The best cotton is obtained from the sub-tropics; in the hotter regions, the staple, that is the length of the fibre, is, as a rule, short and only useful for the native weaving of coarser materials. Sea-island cotton, which has the longest staple, is grown near the coast of the United States, and seems to require salt, both in the air and the soil, for it cannot be grown at any great distance from the coast. At present almost three-quarters of the raw cotton used in England comes from the S.E. of the United States. The cotton plant was probably introduced into the U.S.A. from the West Indies, and the great success which attended the planting of it in the States practically put an end to the growing of cotton in the West Indies. The Civil War in the States (1861-65), brought about by the question of slavery, caused so much distress in England through the closing of factories for want of raw material that merchants decided to experiment with the growth of cotton in Egypt and India. Cotton was already being grown in India, where *Calicut* gave its name to "calico," and India now manufactures most of her own cotton goods.

The combines of recent years, and the fact that the United States requires great quantities of the raw cotton of the southern states for her own mills, together with the growing calls of Germany and France on these supplies, have led British merchants to experiment still further in cotton growing, especially in Uganda, Nigeria, Nyasaland, Queensland, and the West Indies.

The chief cotton ports are New Orleans, Savannah, and New York in the U.S.A., Alexandria in Egypt, Bombay and Surat in India, and Pernambuco in Brazil.

The majority of this raw cotton is imported via the Mersey. Manchester is the chief distributing centre for the English manufacturing towns, while Liverpool is not only the great market for England, but imports to sell again to the Continent. Cotton is also imported at Glasgow.

The cotton industry is carried on in South Lancashire and Lanarkshire. There is iron for making the machinery and coal for working it in both these places. They are also favourably situated as regards America, but, above all, they are in the west of Britain, where the air is damp. This dampness is necessary, as the fibre snaps if the air be too dry.

Manchester, with Salford, Oldham, Rochdale, Burnley, Blackburn, Preston, Chorley, Wigan, Bolton, and Bury in Lancashire, Stockport, Dukinfield, and Hyde in Cheshire, and Glossop in Derbyshire are the chief towns engaged in the cotton industry in England ; Glasgow and Paisley are the chief Scottish centres of cotton manufacture. Nottingham makes cotton lace, hosiery, and net.

Woollen Goods.

The most important animal from which wool is obtained is the sheep, but the goat, alpaca, vicuña, and the camel also provide materials for the manufacture of woollen fabrics. The chief goats famous for wool are the Angora and the Cashmere. The Angora goat is a native of the steppes of Asia Minor, and has been introduced, with much success, into South Africa ; its wool is known as mohair. The Cashmere goat yields the fibre used in the manufacture of the famous Cashmere shawls. The alpaca is a native of the lofty plateaux of the Andes, and is closely allied to the llama. The vicuña also lives in these mountain fastnesses. The camel, which is a native of Central Asia, yields a fibre for coarse materials, and its hair is made use of in many ways by the nomads of the steppes.

The amount of wool produced in this country is not sufficient for our mills. Large quantities, therefore, are imported from Australia, New Zealand, and British South Africa. The chief ports engaged in the export of this article are Sydney (11,630 miles), Melbourne (11,150 miles), Adelaide, and Brisbane (12,100 miles) in Australia ; Wellington (12,520 miles) in New Zealand ; Cape Town (6,220 miles) in South Africa, and Buenos Aires (6,350 miles) in Argentina, but most of the Argentine wool finds its way to the continent of Europe.

By far the largest amount of this imported wool comes into London, which imports eight times as much as Liverpool, the second largest centre. Wool also comes into Southampton and Hull.

Sheep are animals of the temperate region, and their distribution depends upon the amount of pasture in a country. Now the amount of available pasture land depends upon the density of population, and so to-day the great wool-producing countries are the thinly populated districts of the temperate belt. Sheep thrive best where the climate is dry and equable, and free from great cold. They prefer the drier uplands.

Norwich, in the neighbourhood of which Flemish weavers had settled, was the chief centre in the early days of the industry. Near by is situated Worstead, which has given its name to the class of cloth known as "worsteds." Later, John Kemp, one of these Flemish weavers, removed to Westmorland, and started the manufacture of the famous "Kendal Green." Cloth was also manufactured in the West of England, where the chief centres were Westbury, Salisbury, and Sherborne. Later, the industry sprang up in Yorkshire, where there was a great amount of water, which was not only suitable for dyeing, but also provided the power for driving the mills. The Industrial Revolution brought about little change in the localization of the industry, as coal was found both at Bristol and in Yorkshire. The great centres to-day are the West Riding of Yorkshire, the West of England, and Tweeddale. The industry was established in the west of Yorkshire because sheep were reared on the moors. The chief centre is Leeds, and a group of towns in the neighbourhood are all engaged in woollen manufacture, but, generally speaking, each town specializes in one kind of woollen goods; for example, Leeds (woollen cloths), Bradford (worsteds), Wakefield and Halifax (carpets), Huddersfield and Dewsbury (shoddy), Keighley and Saltaire (alpaca).

The chief woollen towns in the West of England are Trowbridge, Bradford, and Westbury in Wiltshire, Frome and Bath in Somerset, and Stroud in Gloucestershire. The chief woollen towns in Scotland are Galashiels, Hawick, Stirling, Bannockburn, Kilmarnock, and Aberdeen.

Carpets are made at Kidderminster (Worcester), Rochdale (Lancs), Halifax (Yorks), and at Kilmarnock and Dundee in Scotland.

Flannel is made at Rochdale (Lancs), Halifax (Yorks), and at Welshpool and Dolgelly in Wales.

Witney is still famous for blankets, but a great number are made in Yorkshire. Leicester makes woollen hosiery.

Linen and Allied Industries.—Flax, hemp, and jute resemble one another in having to pass through similar processes before the fibre can be extracted. The chief regions for these industries are Ulster, East Scotland, and West Yorkshire.

Flax is cultivated to a limited extent in Ulster, but the amount is decreasing yearly. This flax growing, together with the nearness of Ulster to Cumberland and Ayrshire coal, Belfast iron, and suitable water for bleaching, has helped to establish the industry there. But the fact that labour is cheaper than in England has probably assisted more, and made it the principal centre for linen lace. Belfast is the chief town engaged in the

industry, Newry, Armagh, Lisburn, and Lurgan also having important linen manufactories.

The East of Scotland is suitably situated to obtain its supplies of raw material from the Baltic lands, and is near to Fifeshire coal. Besides, the nearness to the sea appears to be a great advantage. Dunfermline, Kirkcaldy, Dundee, Arbroath, Forfar, and Montrose are the chief towns that carry on the industry. Dunfermline makes great quantities of table-linen, Kirkcaldy specializes in linoleum, Dundee is the centre of the jute industry, while the Forfar ports specialize in canvas and sailcloth. The Yorkshire centre, with its chief towns of Leeds and Barnsley, has the advantage of small local supplies, is on a coalfield, and can easily obtain flax from the Continent; but it has not the advantage of a coastal climate, so it cannot turn out such fine work as is done in Scotland and Ireland. Rope-making is carried on in most ports, especially near the Baltic, e.g. Sunderland; and nets are made at places like Yarmouth.

Flax is cultivated in some places for its fibre, but in other parts for its seeds. The seeds yield an oil which is used in the mixing of paints and varnishes, and in the manufacture of linoleum. The seeds from which the oil has been extracted are pressed into cakes for cattle. Flax is grown for seeds in India and America (U.S.A. and Argentina). Russia produces the greatest amount of fibre, supplying the British Isles with about 75 per cent. of her requirements. The best fibre comes from Belgium, which country exports to the United Kingdom about a quarter of Britain's total import of flax.

The flax plant is suited to a variety of climates and soils, but the countries producing fibre are those which, in bygone times, were covered with deciduous forests. It appears that the best soil is that which has been fertilized by the leaves of such forests; moreover, the humus (*i.e.*, the substance formed by the decay of vegetable matter) thus formed holds the moisture required by the flax plant. The presence of phosphates in the soil is also an advantage. Climate appears to have more influence than soil. A moderate temperature is required if the fibre is the object of cultivation, but when seeds are required a high summer temperature does not injure the plant. The great factor that controls the situation of the producing areas to-day is the presence of cheap labour.

Hemp.—The common hemp plant adapts itself to a variety of climates. It is, however, injured by frost when young, and in temperate climates can only be grown where the summers are sufficiently long to bring the plants to maturity rapidly. In Europe hemp is cultivated chiefly for its fibre, and occasionally for its seed; but in warm climates, such as India, it is grown for the intoxicating stimulants derived from the plant. The best hemp of commerce is the Italian variety, especially that produced round Bologna, but by far the greatest amount is produced in France. Hemp is used for the manufacture of ropes, cables, twine, nets, sailcloth, canvas, tarpaulins, and even carpets. There are a number of other fibres, also called hemp, which are put to nearly the same use as ordinary hemp, e.g. Manilla hemp, Sisal hemp, and New Zealand hemp.

Jute is grown chiefly in Bengal, where the soil is fertilized by a thick layer of silt deposited by the flooding of the rivers. The plant succeeds best in a hot, damp climate on the margin of the tropics. There is a large industry in the making of bags in Bengal, and in the United Kingdom the fibre is used

for carpets, curtains, plashes, and many other articles. Jute cannot be used for cordage, as it will not stand exposure to wet.

Silk.—The manufacture of silk goods has almost died out in the United Kingdom. Very little is carried on in Spitalfields and Bethnal Green, where the industry was first established by the Huguenot settlers. Outside London silk-weaving is carried on where streams that furnish pure water are to be found, such as at Macclesfield and Congleton in Cheshire, Leek in Staffordshire, Derby, Ilkeston, and Chesterfield in Derbyshire, Bradford in Yorkshire, and Coventry in Warwickshire. Factories have also been established at Braintree in Essex.

CHAPTER VII

INDUSTRIES. II

IRON AND STEEL

Exercises.

1. Source of the British supplies of iron ore (value in £1,000,000) : Home, 4·0 ; Spain, 3·6 ; Algeria, 0·6 ; Sweden, 0·4. Total, 10. Represent graphically, and find what fraction of the total used is of Home produce and what fraction comes from Spain.

2. The number of blast furnaces in 1918 was 318, and the ore melted was 22,544,064 tons ; how much is this per furnace on the average ? The yield was 9,107,384 tons of pig iron ; what fraction of pig iron is produced from the ore ?

3. On a map of the British Isles shade the iron-smelting districts and insert the chief towns in each.

Iron ore is found in Great Britain in close proximity to coal and limestone, except in Cleveland and Furness. The pig iron obtained after the smelting is then cast, or wrought, or converted into steel. The kind of article into which the iron is ultimately converted depends upon the position of the smelting area. If the smelting area is near the coast, the iron is utilized for shipbuilding ; if in the textile districts, it is used for making textile machinery ; e.g. Manchester, Oldham, Bolton, Accrington make cotton machinery, and Keighley and Leeds woollen machinery. At places far from the sea it is made into small articles, into which as much skill as possible is put to increase the value of the article, so as to make it better able to stand the cost of transport. Agricultural machinery is made in the agricultural districts — at Grantham, Gainsborough, Lincoln, Norwich, and Ipswich.

The iron and steel industry stands next to cotton in importance in the United Kingdom, and as our supplies are insufficient, large quantities of ore and metal are imported, especially from Spain and Sweden. The metal from Sweden is utilized in the steel works of Sheffield, because, having been smelted with charcoal, it is the most suitable for steel-making.

The iron and steel industry may be summarized thus :—

	Smelting Centre.	Use Made of Pig Iron.
1	Clyde	(a) For shipbuilding at Glasgow, Dumbarton, and Clydebank (b) For locomotives, machinery, and hardware at Airdrie, Motherwell, Coatbridge, and Falkirk
2	Middlesbrough and Tyne	(a) Shipbuilding on Tyne, Wear, and Tees (b) Guns and machinery at Newcastle (c) Locomotives at Darlington (d) Rails at Middlesbrough
3	Barrow-in-Furness (uses coal from Cumberland and Scotland)	Shipbuilding
4	Belfast (uses Scotch and Cumberland coal)	(a) Shipbuilding (b) Machinery
5	South Wales	Tin and zinc plate at Newport, Merthyr Tydvil, Swansea, Cardiff, Aberdare
6	Rotherham (Yorks)	(a) Cutlery at Sheffield (b) Locomotives at Doncaster (c) Machinery at Keighley and Leeds
7	South Staffordshire	Hardware, etc., at Birmingham (Warwickshire), Wolverhampton, Walsall, Wednesbury, West Bromwich, Dudley (Worcester), Redditch (famous for needles and fish-hooks), Bournsgrove, and Stourbridge

Locomotives and railway plant are made at Manchester, Birmingham, Glasgow, Newcastle, Darlington, Motherwell, and the great railway centres of Crewe, Swindon, Doncaster, Derby, Stratford, etc.

Copper is smelted at Swansea and Llanelli in S. Wales, while brass is made at Birmingham and Rotherham.

CHAPTER VIII

INDUSTRIES. III

Exercise.

i. On a blank map of the British Isles mark the towns mentioned in this chapter, and write under each what it manufactures.

Pottery is made in N. Staffordshire at Burslem, Hanley, Stoke-on-Trent, Newcastle-under-Lyme, Etruria, and Longton, which places now form one town for the purposes of local government. It was the fine clay found in this district which led to the establishment of the industry, but these deposits having been exhausted, clay is now brought from Cornwall, S. Devon, Poole Harbour, etc. Worcester and Derby make

porcelain, Stourbridge (Worcester) makes firebricks, and there are potteries in London, S. Devon, and elsewhere.

Glass is made where coal and silica can be readily obtained, e.g., at St. Helens (Lancs), Birmingham, Dudley, Stourbridge, S. Shields, and Glasgow.

Chemical Industries.—As salt is the basis of the chemical industry, the making of chemicals is carried on at Newcastle, which uses salt from Cleveland, at Widnes (Lancs), which uses Cheshire salt, and Glasgow, with salt obtained from the neighbourhood of Belfast.

Soap is made at places where fats or vegetable oils can be cheaply procured. London and West Ham obtain great quantities of tallow from imported cattle and the fatty refuse of the food supply. Birkenhead (Port Sunlight) utilizes imported palm oil. Soap is also manufactured at Glasgow.

Leather, and, in consequence, boots and shoes, are made where skins are easily obtained, that is, in the Midland counties, which is the great region for cattle-raising, e.g., at Stafford, Leicester, Northampton. There are also tanneries in London, but these depend upon imported hides.

Paper-making is carried on where there is a suitable water supply, as in the Edinburgh district, the Home counties, and at Darwen and Bacup.

Brewing is carried on in districts where there is barley (from which malt is obtained), hops, and water free from organic salts. The chief brewery towns are London, Burton-on-Trent (Staffs), Romford (Essex), and Dublin.

CHAPTER IX

COMMERCE

Exercises.

1. Plot curves to show the value of the trade of the United Kingdom for the last eleven years (imports, exports, and total). Figures are in million pounds sterling. Account for the great increase after 1914.

	Imports.	Exports.		Imports.	Exports.
1910	670	534	1915	852	484
1911	680	556	1916	948	604
1912	745	599	1917	1,064	597
1913	769	635	1918	1,316	532
1914	697	526	1919	1,626	903
			1920	1,502	1,007

2. The value of the imports into the United Kingdom are, in million pounds : Grain and flour, 77 ; raw cotton, 71 ; meat, 49 ; timber, 25 ; butter and mar-

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gerine, 24 ; raw wool, 36 ; sugar, 24 ; silk manufactures, 13 ; woollen manufactures, 10 ; fruit, 14 ; tea, 11 ; leather, 12 ; hides, skins, etc., 8 ; eggs, 7 ; cheese, 7 ; iron ore, 5. Total, £678. Find the total value of food products and raw materials, and find what fraction each of these is of the total.

3. The value of the exports of the United Kingdom in million pounds are : Cotton manufactures, 120 ; iron and steel, 50 ; coal and fuel, 38 ; woollen manufactures, 37 ; machinery, etc., 40 ; chemicals, 21 ; apparel, 13 ; linen manufactures, 6 ; leather, 5. Total, £454. Find what fraction the value of the exports of cotton, iron, and woollen goods are of the total. Represent graphically.

4. The trade of the United Kingdom is carried on as in the table below. Draw two circles of 5 in. diameter, and divide up to represent graphically the trade (import and export) with the Colonies, U.S.A., and the Continent.

Country.	Imports.			Exports.		
	Value in Million £			Value in Million £		
British Possessions	*	171	171	
U.S.A.	125	58	
France	41	35	
Netherlands	18	17	
Germany	65	57	
Russia	43	22	
Belgium	20	18	
Argentine	21	19	
Denmark	20	5	
Sweden and Norway	18	12	
Spain	14	6	
Egypt	21	10	
Brazil	13	14	
Turkey	6	9	
China	5	12	
Italy	7	14	
Japan	4	12	
Total	618	401	

Before the war the U.K. was, commercially speaking, the most flourishing of all the nations of the world, her total trade being nearly twice as great as the average of the three countries that came nearest to her, viz., the U.S.A., France, and Germany. It remains to be seen whether she will regain her position. The majority of the population of the U.K. is engaged in manufactures, agriculture being carried on to a comparatively small extent. The people are, consequently, dependent upon foreign countries for a very large proportion of their food supply, sending to them in return coal or manufactured articles. The total value of the imports (£586,000,000, average for 1904-13) and total value of exports (£427,000,000) giving a total of £1,013,000,000, which works out at about £25 per head of the population (imports, £15 ; exports, £10).

Our trade is greatest with the United States, Canada, France, Germany, Russia, Holland, Belgium, and Denmark. The table in Exercise 4 shows that the goods imported and exported

naturally fall under three heads, viz., foodstuffs, raw materials, and manufactured goods. The value of the raw materials and foodstuffs imported is very nearly the same (£260,000,000),¹ while the manufactured articles make up three-quarters of the total of the exports. Corn, sugar, butter, tea, bacon and hams, wine, coffee, cocoa, and animals are the chief foodstuffs imported.

Wheat is imported chiefly from the United States, Russia, Argentina, Canada, and India. The wheat harvest takes place in different months in the year in the various wheat-growing countries. This, together with the wide distribution of its cultivation, makes the supply fairly regular. The chief countries from which we obtain our supplies of wheat are the United States, 44 % ; Canada, 9 % ; Russia, 6 % ; India, 6 % ; Argentina, 6 % ; Rumania, 4 % ; Australia, 3 % ; Home, 21 %.

Wheat Ports : Buenos Aires (6,350 miles) ; Melbourne (11,500 miles) ; New Orleans (4,800 miles) ; New York (3,000 miles) ; Montreal (3,100 miles) ; Trieste (3,000 miles) ; Odessa (3,520 miles) ; Karachi (6,000 miles). These distances are measured from London.

Maize requires a higher summer temperature than wheat, and therefore it is grown nearer the equator, but it requires also abundant moisture and a rich soil. Very little is grown in the Mediterranean region, the climate being too dry. Maize is used as food for hogs, cattle, and poultry, and is also ground into corn flour. The plant is a native of America, and the United States produces more maize than any other country in the world. Great Britain obtains her supplies of maize from Argentina, 40 % ; United States, 20 % ; Rumania, 20 % ; Russia, 10 % ; Canada, 4 % ; Turkey, 1 %.

Barley, being the hardiest cereal, grows over a wider range of latitude than any other, but it prefers a warm and fairly dry climate. Barley is used chiefly for making malt, and in the regions where it is grown breweries or distilleries are to be found. The majority of the barley imported into the United Kingdom comes from Russia, 45 % ; Turkey, 15 % ; Rumania, 12 % ; United States, 12 % ; Germany, 2 % ; Canada, 2 %.

Oats grow best in a damp and cool climate, and will thrive on poorer soils than wheat, but requires a longer time than barley to mature, therefore it is not grown to any extent N. of 65° N. Britain imports from Russia, 65 % ; Rumania, 12 % ; Turkey, 5 % ; U.S.A., 4.5 % ; Canada, 4 %.

Rice requires heat and moisture, but the supply of moisture must be regulated. The plant requires to be flooded while growing, but the water must be drained off during the harvest. There is, however, one variety of poor quality which will grow on hill-slopes, like any other grain, without flooding. Rice is grown on low-lying seabards, or in valleys that can be easily irrigated. Rice is the staple food in the monsoon countries of S.E. Asia. The United Kingdom obtains her supplies from Burmah, 54 % ; India, 18 % ; Straits Settlements, 4 % ; Siam, 4 %.

Sugar is obtained from a number of plants, but the chief products that enter into the world's markets are sugar obtained from the cane and from the beet. The sugar-cane requires heat and moisture, and grows in tropical countries as, e.g., the West Indies, Java, India, and the Guianas. The sugar-beet grows in temperate lands. It requires a more scientific treatment than the sugar-cane, but as it is produced near the great markets it has almost displaced cane sugar. The United Kingdom imports sugar from Germany, 60 % ; France, 14 % ; Holland, 8 % ; Belgium, 4 % ; Argentina, 2 % ; Brazil, 1 % ; British Possessions, 5 %.

¹ Almost £700,000,000 in 1919.

Tea is grown in the monsoon countries of S.E. Asia. The plant requires warmth and summer rains, but, as injury is done to it if water is allowed to stay round its roots, the plantations are to be found on hill-slopes. Frost does not kill it, but checks its growth. The cultivation of tea is not possible in some countries, owing to the absence of cheap labour, which is a necessity. India, China, and Ceylon supply the United Kingdom with nearly all her requirements.

Coffee is obtained from the berries of a small shrub, a native of Abyssinia, from which it was introduced into Arabia and later into the New World. Arabian coffee is still famous, but more than three-fifths of the world's coffee is produced in Brazil. This plant requires heat, moisture, and vegetable refuse. It is injured by frost and is therefore grown in the tropics, generally on cleared land. When young it is often grown under the shade of other plants, as it requires protection from the direct rays of the sun. The following countries supply Great Britain with what she needs : Brazil, 16 % ; United States, 12 % ; Costa Rica, 12 % ; Colombia, 8 % ; Guatemala, 5 % ; British Possessions, 20 %.

Cacao beans, from which cocoa and chocolate are made, are obtained from the pod of a plant indigenous to America. It requires warmth, moisture, and a soil enriched with decayed vegetable matter, and is grown therefore in the tropics, but, as a rule, in lowland, and nearer to the equator than coffee. Like coffee, the young plant requires protection from the rays of the sun. Tropical America produces the majority of the cocoa of the world. The United Kingdom obtains her supplies from British West Indies, 30 % ; Ceylon, 9 % ; other British Possessions, 2 % ; Portugal, 25 % ; France, 9 % ; Ecuador, 6 % ; Brazil, 5 %.

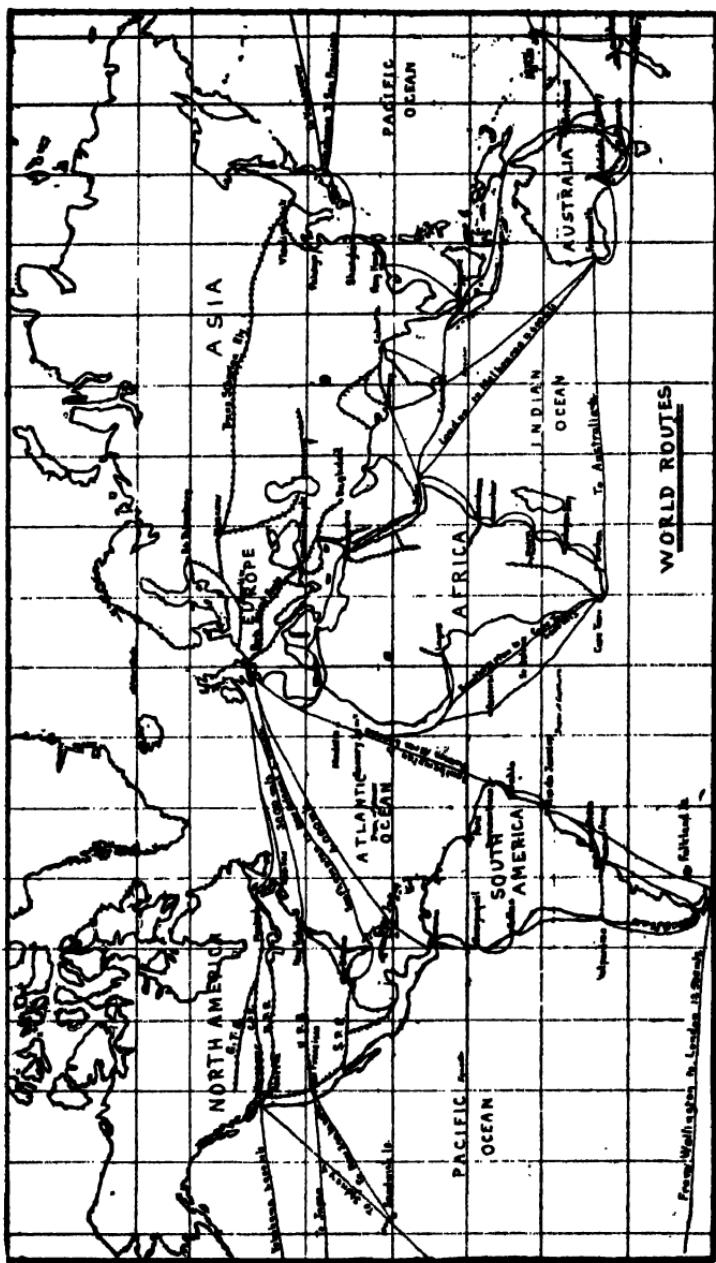
Meat.—The British supply of meat is made up of beef, 48 % ; mutton, 20 % ; pig-meat, 28 % ; and this is obtained from home produce, 53 % ; U.S.A., 22 % ; Argentina, 8 % ; Canada, 5 % ; New Zealand, 5 %. The imported meat comes in either as live animals, or as chilled, frozen, or tinned meat. There has been a trade in live animals for some time, but it was not until the invention of the refrigerator and the introduction of canning towards the close of the nineteenth century, that the import of dead meat developed. At the present time the U.S.A. produces far and away the largest quantities of meat, Chicago, St. Louis, and Omaha being the great centres. The countries round the Plate estuary, especially Argentina, are increasing their produce, so also are Australia and New Zealand.

TRADE ROUTES.

The great trade routes of the world are :—

The Atlantic Route.—Liverpool is the chief port for this route at the British end, and Montreal, Boston, New York, Philadelphia, Baltimore, New Orleans, Galveston, at the American end. The trade consists of grain, timber, meat, tobacco, cotton, fruit, and oil.

The West Indian Route.—Vessels run from Avonmouth and Southampton to the West Indies and the N. of S. America. The goods brought to Britain are mahogany, tobacco, fruit, cocoa, coffee, sugar, rum, etc. The opening of the Panama Canal affects this route because the Canal shortens the distance between London and San Francisco by 6,000 miles, and that from New York to San Francisco by 9,000 miles. It



MAP 14.—WORLD ROUTES.

also shortens the distance between Britain and the west coast of S. America.

The Plate Route includes Brazil with the ports of Manaos, Bahia, Pernambuco, Rio de Janeiro; Monte Video, the port of the Uruguay, and Buenos Aires, the port of Argentina. The trade includes rubber, coffee, rosewood, diamonds, cotton, sugar, grain, wool, and meat.

The Suez Route gives connection with East Africa, Persia, Arabia, India, China, the East Indies, and Australia. The majority of the vessels start from the port of London, but the larger vessels do not come any farther up the Thames than Tilbury. The chief goods imported consist of tin ore, tea, silk, wheat, rice, jute, cotton, sugar, wool, butter, wheat, and mutton.

The Mediterranean Route.—The products brought along this route include wheat, maize, and petroleum from the Black Sea, fruit, olive oil, wine, silk, sulphur, marble, wheat, and cotton from the Mediterranean ports.

The Cape Route is the route to South Africa. The liners on this route start from Southampton or London, and run to Cape Town, Port Elizabeth, East London, Port Natal. The chief goods imported from these places consist of gold, diamonds, copper, wool, and ostrich feathers. From West Africa, rubber, mahogany, palm oil, and copra are exported. The majority of this trade is done with Liverpool. The Cape route is sometimes used for the Australian trade.

Other Routes.—Regular lines of steamers also cross the Pacific, connecting Vancouver, in British Columbia, and San Francisco, in the U.S.A., with ports in Japan, China, and Australasia.

Quicker communications can be had by making use of the railway lines that cross the continents, viz. :—

1. The overland route : London via Paris to Brindisi, and then by sea to the East.
2. The trans-Siberian route : London via Moscow to the Pacific.
3. The trans-continental lines of Canada and the U.S.A.
4. The trans-Andine line which shortens the distance between London and Valparaiso.

CHAPTER X

COMMERCE. PORTS

Exercises.

- 1.—Draw a circle 5 in. in diameter, and divide this up to show the share in the trade taken by the great ports of the British Isles from the following table (value in million pounds): London, £320; Liverpool, £310; Hull, £65; Manchester, £44; Glasgow, £43; Southampton, £37. Total, £1,100,000,000.

2. Draw a sketch map of the Irish Sea, showing the routes connecting Britain with Ireland, and insert the ports connected with them.
3. Draw a sketch map of the North Sea and insert the routes connecting Britain with the Continent, marking in the ports at each end.

London and Liverpool each do almost one-third of the total trade of the United Kingdom. The value of the imports is nearly three times the value of exports in the case of London, whereas with Liverpool the value of each is nearly the same, but London re-exports one-fifth of her imports. She is thus a great entrepôt, *i.e.*, a centre for the distribution of goods. London carries on a trade with all the world, but especially with Australia and the West Indies, and besides this she has a larger coasting trade than any other town in the world. The port of London extends along both banks of the Thames, from London Bridge as far as Queenborough on the Isle of Sheppey. The largest vessels discharge their cargoes at Tilbury Docks, where there is a depth of 38 ft. of water, and in consequence the amount of traffic on the Tilbury section of the Midland Railway is very heavy. Connected with London are a number of coastal towns, that carry on a trade with the Continent chiefly in perishable goods, as, for example, Harwich (to the Hook of Holland, Hamburg, etc.), Queenborough (to Flushing), Dover (to Calais and Ostend), Folkestone (to Boulogne), and Newhaven (to Dieppe).

The only large port of the south coast is Southampton, which stands on Southampton Water and is protected by the Isle of Wight. This port carries on a trade with the Continent, via Havre, and with the Channel Islands, but most of the trade is with South Africa. The goods are taken up to London by the London and South Western Railway.

A large amount of trade is carried on with the Continent in addition to that through the outports of London, and, as one would naturally expect, the ports taking part in this trade are on the east coast, *viz.*, Aberdeen, Dundee, Leith, the Tyne ports, Sunderland, and the Humber ports. As these ports are on the North Sea, fishing forms an important means of support for the inhabitants; and as they face the Baltic region their imports are timber, ice, flax, hemp, and jute, with some iron ore from Sweden.

Aberdeen is the most northerly of the important ports. It exports granite, and many vessels leave this port to take part in the whale fishery of the Arctic seas. It is 300 miles from the coast of Norway.

Dundee imports flax, hemp and jute for the manufacture of linen, ropes, and sacking in the neighbourhood, and some fruit.

Leith is the port of Edinburgh, and is an outlet for the important lowland district of Scotland.

The Tyne ports (Newcastle, Gateshead, North and South Shields, etc.)

export great quantities of coal, and import timber, Swedish and Spanish iron ore for the shipbuilding yards on the banks of the Tyne.

Sunderland, on the Wear, does the same kind of trade.

Middlesbrough, on the Tees, is the port of the iron-smelting towns of the Tees valley. Timber is imported, chiefly through the Hartlepools.

Humber ports (Hull, Grimsby, Immingham, Goole). Hull imports wool, wheat, timber, and iron ores, and exports the woollen manufactures of West Yorkshire and the iron goods of the Don valley ; Grimsby, in Lincolnshire, does a great trade in fish and timber ; while Goole exports some coal and imports timber for the mines, etc.

The ports on the west of Britain trade with Ireland, and also across the Atlantic. Liverpool and Birkenhead on the Mersey commands the American and West African trade. Larger vessels enter this port than enter any other port in the British Isles. The docks are the finest in the world ; there are 34 miles of quays. The only drawback to the port is the bar across the mouth of the Mersey. The chief imports are raw cotton, wheat, cattle, timber, tobacco, oil, and the chief exports are cotton goods, chemicals, oils, soaps, and some woollen goods from Yorkshire exported to N. America. Manchester, connected with Liverpool by the Manchester Ship Canal, takes part in this trade, but her most important import is cotton.

There are a group of busy ports on the lower Severn, viz., Bristol, Cardiff, and Swansea. Bristol was once a very important port, but her trade decayed when Liverpool began to make headway. The recent development of the West Indies in the export of fruit, especially bananas and oranges, and the building of docks at Avonmouth, have helped to revive her trade. Cardiff is advancing rapidly. She is the great outlet for S. Wales, and exports more coal than any other town in the world. Swansea imports iron ore and copper ore from Spain and tin ore from the Straits Settlements, and exports iron ware, especially tin-plate.

The Clyde ports (Glasgow, Dumbarton, Port Glasgow, Greenock) are more important for their shipbuilding than for their carrying trade ; still Glasgow does a fair trade with North America. Glasgow is about 60 miles nearer New York than Liverpool is. The liners that leave Glasgow for Montreal or New York call at Moville in the north of Ireland on their way out.

Besides these ports on the west coast there are a number of towns that take part in the trade with Ireland. They might be called ferry towns. Stranraer connects with Larne ; Heysham, Fleetwood, and Liverpool connect with Belfast ; Holyhead with Dublin ; Milford, Pembroke, and Bristol with Wexford and Waterford ; recently Fishguard in S. Wales has sprung into importance, owing chiefly to the desire of the G.W.R. to make the route to Killarney as short as possible, and to take a part in the American trade.

There is daily connection between Fishguard and Rosslare, the outport of Wexford.

The largest ports of Ireland, Belfast, Dublin, Wexford, Waterford, and Londonderry, are all on the east, the only port of any size on the west being Limerick. This is because Ireland chiefly produces dairy produce, which has no outlet to the west, *i.e.* America, but is wanted in the east, *i.e.* Great Britain. In exchange for her dairy produce Ireland imports coal and manufactured goods from Great Britain.

CHAPTER XI

INLAND COMMUNICATION

Exercises.

1. Shade in all the land over 600 ft. in the British Isles, and then insert the railways, naming the chief junctions.

2. On a blank map mark the time taken by express trains to reach the most important places in the United Kingdom from London. Then draw lines connecting places of 1 hour's, 2 hours', 3 hours', etc., journey.

3. Make a tracing of the outline of the British Isles and insert and name the canals.

Goods are taken to the ports from the interior and *vice versa* by water, rail, or road. The traffic along the roads has increased rapidly since the introduction of motors. Many of the rivers are navigable for some distance inland, and several canals have been dug, but they are not used so much as they might be, except in the case of those canals that join the rivers flowing east with those flowing west.

CANALS.

Scotland—

1. The Forth and Clyde Canal connects Glasgow with Grangemouth.
2. The Crinan Ship Canal runs across the north of the Kintyre Peninsula.
3. The Caledonian Ship Canal follows Glenmore, but is now used chiefly by tourists, being too far away from the great centres of population to have a large goods traffic.

England—

4. The Thames and Severn are connected by canals running from the Kennet to the Bristol Avon, and from Lechlade to Stroud.
5. The Grand Junction and the Union Canals connect the Thames and Trent, running via Brentford, Watford, Wolverton, Leicester, and the Soar.
6. The Grand Trunk Canal runs from Runcorn (Lancs) to Birmingham.
7. The Oxford Canal runs via Banbury, Rugby, Nuneaton to Burton.
8. The Severn and Trent Canal runs from Worcester through Birmingham to Burton.
9. The Leeds and Liverpool Canal follows the Aire Gap, and runs through Blackburn, Burnley, and Skipton.
10. Manchester is connected with Goole by a canal which pierces the Pennines a few miles west of Huddersfield.
11. The Manchester Ship Canal, which is 35½ miles long, leaves the Mersey

estuary at Eastham, and runs via Runcorn and Latchford to Manchester. It is 28 ft. deep and 120 ft. wide at the bottom. There are no locks in the first 21 miles, but between Latchford and Salford there are four locks, which raise vessels 60 ft. This canal allows ocean vessels to go into the centre of the cotton district, and has been the means of creating Manchester a seaport.

Ireland—

12. The Grand Canal joins the Liffey with the Shannon (between L. Ree and Derg).
13. The Royal Canal joins the Liffey with the Shannon (near Longford).
14. The Erne and Shannon Canal.
15. The Ulster Canal connects the Erne with the Blackwater and L. Neagh.
16. The Newry Canal connects Newry with Carlingford Lough.

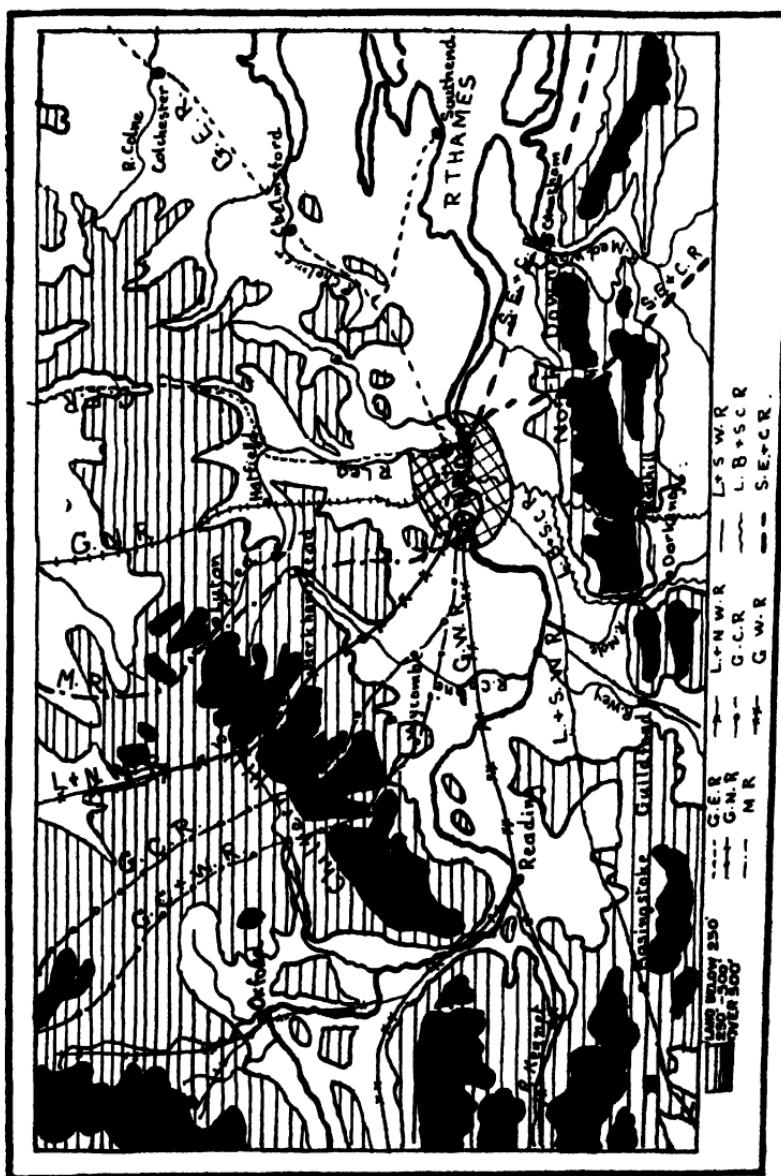
RAILWAYS OF ENGLAND.

The majority of the English railways radiate from London, and are named according to the direction which they take. Their routes are to a large extent controlled by physical features. This is well seen in the way the railways leave London. The modern desire for quickness, however, has made engineers straighten the course, and tunnel through rather than go round obstacles.

The London area is surrounded by a chalk ridge, except in the east where the Colchester line of the G.E.R. and the Tilbury branch of the Midland Railway have no obstacles to overcome, while all the other lines have to find a way through this chalk barrier. Many of these lines do this by following gaps in the hills. The lines that go to the north have also to get round the heights of Hampstead and Highgate, and the Barnet Ridge, before they reach the Chilterns. The Cambridge line of the G.E.R. keeps far to the east of these by following the valley of the Lea and its tributary the Stort. The G.N.R. avoids Highgate by keeping to the east of it, while the M.R., the L. & N.W.R., and the G.C.R. keep west of the Hampstead Heights. The G.C.R. and the L. & N.W.R. go to the west of Barnet Ridge, the Midland and the G.N.R. cross it, and, as there are no gaps, cuttings and tunnels are made in the narrowest places of the high parts.

All the lines make for gaps in the Chilterns—the G.E.R. by cuttings and tunnels makes for Chesterford, the G.N.R. utilizes the Stevenage Gap, the M.R. the Luton Gap, the L. & N.W.R. the Berkhamstead Gap, and the G.C.R. the Wendover Gap.

The Great Western Railway follows the Thames westwards, getting past the chalk by following the Goring Gap, or by going up the valley of the Kennet to Newbury and Devizes. The main line of the London and South-Western makes for a low part of the chalk barrier and passes through Basingstoke,



MAP 15.—RAILWAY ROUTES OUT OF LONDON.

while the Portsmouth branch crosses the North Downs by following the valley of the Wey, which is guarded by Guildford. The Portsmouth branch of the London, Brighton, and South Coast Railway follows the Mole Gap through the North Downs, while the main line to Brighton tunnels through the chalk at Merstham. The old South-Eastern line of the South-Eastern and Chatham Railway has cuttings and tunnels through the chalk, while the Chatham branch keeps close to the Thames, but here also there are cuttings and tunnels in the chalk.

The **Great Eastern Railway** (Terminus : Liverpool Street) practically monopolizes the transport of the eastern counties. Its two chief lines are known as the Colchester and Cambridge lines. The *Colchester Line* crosses the Lea at Stratford, and runs through Ilford, Romford, Colchester, Ipswich to Norwich, Yarmouth, etc., with branch lines to the coast at Southend, Clacton, Harwich, etc. The *Cambridge Line* follows the valley of the Lea and Stort, passing through Bishop's Stortford, Cambridge, Ely to King's Lynn and Lincoln, with branches to Hertford, Buntingford, etc.

The **Great Northern Railway** (Terminus : King's Cross) runs almost due north through Hatfield, Hitchin, Peterborough (branch to King's Lynn and Yarmouth), Grantham (branch to Nottingham), Doncaster, where it joins the N.E.R. and sends off branches to Grimsby and to the woollen district of the West Riding of Yorkshire.

The **North-Eastern Line** carries communication on to Berwick via York (branches to Scarborough, Whitby, and Bridlington), Darlington, Durham, and Newcastle (branch, via Tyne Gap, to Carlisle). Branches also serve the counties of Northumberland, Durham, and Yorkshire. At Berwick the line connects with the North British Railway, which connects with Scotland. The G.E.R., the G.N.R., and the N.E.R. together form what is known as the *East Coast Route*.

The **Midland Railway** (Terminus : St. Pancras) connects London with Carlisle, where it runs in connection with the Waverley Route of the North British Railway and the Glasgow and South-Western Railway for Edinburgh and Glasgow respectively. It passes through the Midland counties on its way to the woollen district of the West Riding of Yorkshire, then crosses the Pennines by following the Aire Gap. The chief towns on the main line are Luton, Bedford, Leicester, Nottingham, Sheffield, Leeds, and Settle. To the north of Settle a branch leaves for Barrow and Heysham, which is growing in importance as a port for Ireland. Branches also connect with Derby, Matlock, and, via the beautiful valley of the Derwent,

with Manchester, while another branch runs from Derby via Birmingham to Bristol.

The **London and North-Western Railway** (Terminus : Euston) makes almost straight for Crewe in the Cheshire Gap, passing through Rugby (branch to Birmingham), Stafford, Crewe (branches (1) via Chester and coast of N. Wales to Holyhead for Dublin, (2) to Manchester, Huddersfield, and Leeds). Warrington (branch for Liverpool), Preston to Carlisle, where it connects with the Caledonian Railway for Edinburgh and Glasgow, forming the *West Coast Route*. Two small lines connect with the L. and N.W.R., the *Cambrian Railway* serving part of the coast of Wales, and the *Furness Line* serving parts of Cumberland and the Lake district.

The **Great Central Railway** (Terminus : Marylebone) is a development of the old Manchester, Sheffield, and Lincolnshire Railway. It runs through Aylesbury, Rugby, Leicester, Nottingham, to Sheffield, where it passes east to Lincoln and Grimsby, and west to Manchester and Liverpool.

The **Great Western Railway** (Terminus : Paddington) clings to the Thames valley on its journey westward. It passes through Reading, Didcot, Swindon, Chippingham (branch to Weymouth), Bath, Bristol (branch to S. Wales) Exeter and south of Dartmoor to Plymouth and Penzance. The chief branch of the line runs via Oxford, Birmingham, Wolverhampton, Shrewsbury, Chester to Birkenhead, connecting with the Cambrian Railway at Oswestry. The line to Worcester also runs via Oxford and up the valley of the Evenlode. This railway shows well the changes that have taken place to make the line shorter by straightening the route. The main line to the west now avoids Bristol by leaving the Thames at Reading and following the Kennet valley to Westbury, and on to Taunton. Just in the same way to make the journey to Fishguard as direct as possible, the line to S. Wales now leaves the main line at Wootton Bassett and goes via Badminton, avoiding Bristol, to the Severn Tunnel, which is 4 miles 624 yards long. The latest change is the straightening of the line to Birmingham, which now runs via High Wycombe, Princes Risborough, Banbury, Leamington, and Warwick.

The **London and South-Western Railway** (Terminus : Waterloo) runs via Basingstoke (branch for Southampton, Bournemouth, and Weymouth), Salisbury, Exeter (branch for Ilfracombe), and north of Dartmoor to Plymouth.

The **London, Brighton, and South Coast Railway** (Termini : Victoria and London Bridge) runs to Brighton, and from there along the coast eastwards to Hastings and westwards to Portsmouth, which is also connected with London by a line via

Dorking. This line connects with the Continent by way of Newhaven.

The **South-Eastern and Chatham Railway** (Termini : Victoria, Charing Cross, Cannon Street, and Holborn) has the two main routes of the old lines, (1) via Tonbridge (branch to Hastings via Tunbridge Wells), Ashford (branch to Canterbury, Margate, etc.) to Folkestone and Dover ; (2) via Chatham to Canterbury, Margate, and Ramsgate. This line does a very large amount of Continental traffic through Folkestone to Boulogne, Dover to Calais and Ostend, and Queenborough to Flushing.

The **Lancashire and Yorkshire Railway** is the most important of the lines which do not come to London. It connects the busy industrial centres of the north of England by tunnelling the Pennines.

RAILWAYS OF SCOTLAND.

The **Caledonian Railway** runs from Carlisle up Annandale and via Lockerbie, Carstairs (branch to Edinburgh), Motherwell (branch to Glasgow), Stirling, Dunblane (branch to Oban), Perth, Forfar, to Aberdeen.

The **North British Railway** connects with the North-Eastern Railway at Berwick, and with the Midland at Carlisle. From Berwick the line reaches Edinburgh via Dunbar, and from Carlisle the Waverley route reaches Edinburgh via Liddesdale, Hawick, and Galashiels. Lines from Edinburgh run via Falkirk and by way of Bathgate. The main line goes north from Edinburgh via Dalmeny, the Forth and Tay bridges to Dundee, Arbroath, Montrose, and Aberdeen. A line also runs from the Forth Bridge to Perth. The West Highland line runs by Loch Lomond, the Moor of Rannoch to Fort William and Mallaig on the Sound of Sleat.

The **Glasgow and South-Western Railway** runs from Carlisle to Glasgow via Dumfries (branch to Wigtown and Stranraer), Nithdale, and Kilmarnock. From Kilmarnock there is a branch line to Ardrossan, Troon, and Ayr.

The **Highland Railway** runs from Perth via Dunkeld, Killiecrankie, Drumochter Pass, Blair Athol, Aviemore (branch to Nairn and Elgin), Inverness, Dingwall (branch to Stromness Ferry, for the island of Skye), Tain, Wick, and Thurso.

The **Great North of Scotland Railway** runs from Aberdeen to Elgin (branches to Banff, Peterhead, and Fraserburgh).

RAILWAYS OF IRELAND.

The **Great Southern and Western Railway** runs from Dublin to Cork via Kildare (branch to Wexford), Maryboro-

(branch to Waterford), and Mallow (branch to Tralee, Limerick, and Sligo).

The **Midland Great Western Railway** runs from Dublin to Galway and Clifden, with branches to Westport and Sligo.

The **Great Northern Railway** runs from Dublin via Drogheda, Dundalk, to Bundoran via Erne valley, to Londonderry, via Foyle valley, and to Belfast via the valley of the Lagan.

The **Midland Railway, Irish Section**, connects Belfast with Londonderry.

The **Dublin and South-Eastern Railway** runs from Dublin, via Bray and Wicklow, to Waterford and Wexford.

CHAPTER XII

THE POPULATION

Exercises.

1. According to the census of 1911 the population of the U.K. was as follows : England and Wales, 36,070,294 ; Scotland, 4,759,445 ; Ireland, 4,390,219. Total, 45,369,090.¹ Find what fraction each country has of the whole, and represent graphically. The area of each is : England and Wales, 58,324 sq. miles ; Scotland, 30,405 sq. miles ; and Ireland, 32,360 sq. miles. Find how many people there are to the square mile in each country, and in the United Kingdom as a whole.

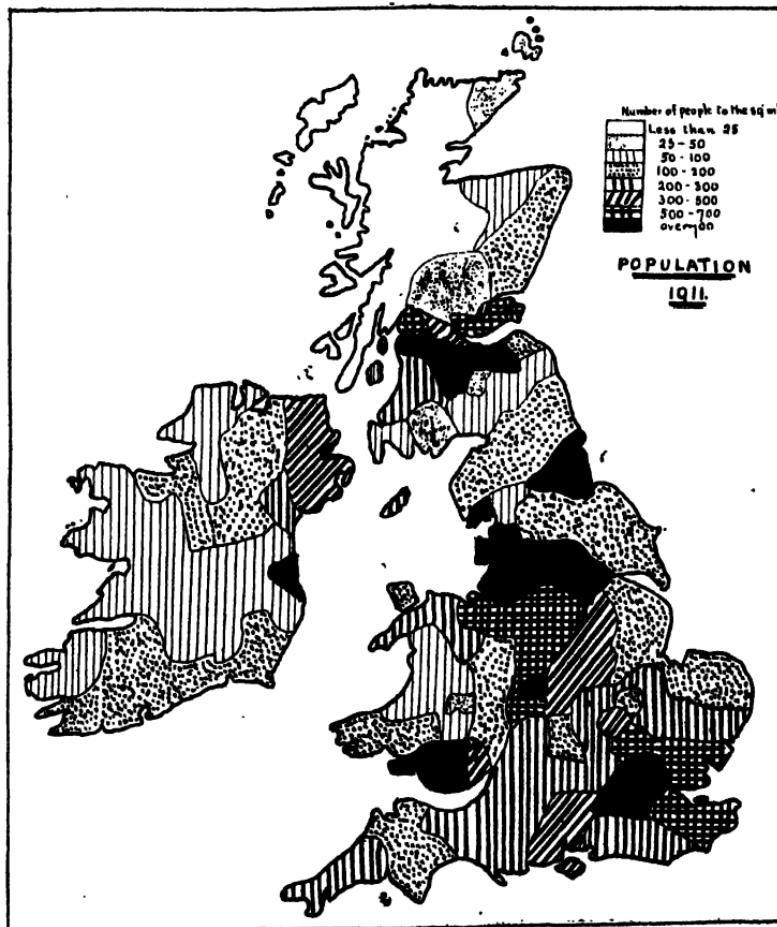
2. Compare the map of the distribution of population with the orographical and mineral maps. What do you notice ?

If you look at the map showing the distribution of population you will notice that (1) The most densely populated districts are S. Lancashire, West Riding of Yorkshire, round the Tyne, Staffordshire, the Lowlands of Scotland, and round London ; (2) That the most thinly peopled district is in the Highlands of Scotland, where the soil is poor and the climate raw and damp. In this district the people live on the more fertile coastal strip of the east, and in Caithness, where the rock is of sandstone, which weathers into a richer soil than the Archæan rocks of the mountains.

When this map is compared with the map showing the minerals it is found that the regions of dense populations outside London are on the coalfields, where iron is found to make the machinery, and coal can be obtained cheaply to generate the steam required to drive the machinery. The distribution of the population is altogether different to-day from what it was before the Industrial Revolution, when Lancashire and Yorkshire were amongst the most thinly populated districts, the more densely peopled regions being the rich fertile districts of South-east England.

¹ Including the Channel Islands and the Isle of Man.

Peoples.—The people of Britain resemble one another in being narrow-headed, but they vary considerably in stature and in the colour of the hair and eyes. The same language is spoken throughout the islands, except in the mountainous districts of Scotland, Wales, and Ireland, and until recently in Cornwall and the Isle of Man. The languages spoken in these parts are of

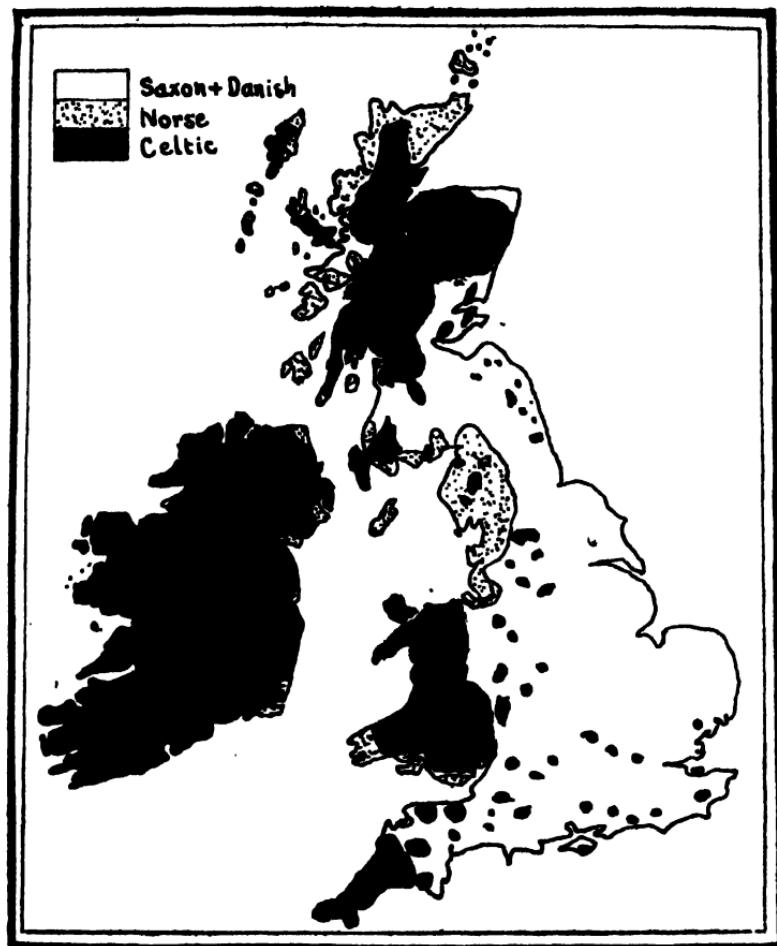


MAP 16.—POPULATION.

Celtic origin, viz. : Erse of the Irish, Manx of the Isle of Man, Gaelic of the Scotch Highlands, Welsh, and the old Cornish language. The survival of these languages is largely due to the remoteness of these parts of the U.K. from the English influence.

The British Islands, lying near the Continent, and turning their best face that way, have been invaded by various peoples from the Continent. All

of these invasions, except those of the Norsemen, seem to have taken place on the east coast, and to have gradually extended westwards. It is unlikely that, after any conquest, the whole of the original inhabitants were killed off. Some continued to live on in the poorer parts, and, no doubt, intermarriages took place, so that to-day the population is the result of much intermixture.



MAP 17.—PLACE NAMES.

The earliest inhabitants of Britain were those called Palæolithic people. These were followed by people who made superior weapons of stone and buried their dead in long barrows. They were short of stature, had dark hair and eyes, and were narrow-headed. They are believed to have formed part of the *Mediterranean Race*. Britain was, towards the end of the New

Stone or Neolithic Age, invaded by a people from Gaul, the Low Countries, the Valley of the Rhine, and elsewhere. These people were also dark, but were taller and had broad heads, and they buried their dead in round barrows. They belonged to what is called the Alpine stock, that is, they resembled the peoples that live on the higher and poorer lands of Central Europe to-day. These broad-headed people introduced bronze to our islands. They, no doubt, drove the people they found in the island into the poorer districts, but they do not appear to have reached or settled in Ireland. The first Celtic-speaking invaders were the Goidels, who certainly reached Ireland during the bronze age. The Brythonic tribes followed, and probably introduced iron into Britain. Then came the Belgae from the North of France, who, with the Brythones, settled over the greater part of S. England and Scotland. The origin of the Celtic-speaking peoples is a matter of dispute. They appear to have been tall, and, as a rule, fair, and to have already mixed with other races.

Britain was then conquered by the Romans, who left cities, roads, and introduced new customs, but they did not affect the racial characteristics of the people, because they formed a ruling class and rarely intermarried with the conquered people. After the withdrawal of the Romans in 410 A.D., Teutonic people invaded Britain and drove the earlier inhabitants into the west and north. The Teutonic people are found in the east. They belong to what is known as the Northern Race of Europe, and have blue eyes, light hair, and are tall. Norsemen also invaded our islands, especially along the west of Scotland, the Isle of Man, and Cumberland, where the names of places tell of their settlements. The last great invasion was that of the Normans, who were also Northmen and belonged to the Northern race. They altered the government and the language a little, but, being few in number, did not change the race to any extent.

A study of place-names throws great light on the movements of peoples. All places, rivers, and villages had Celtic names. The Romans left very few names, but with the coming of the Saxons the Celts were driven into the marshes, forests, and the mountains of the west and north, and Saxon names replaced the Celtic words. Where the Danes settled in Norfolk, Lincoln, and Yorkshire we find Danish names, e.g., Whitby, Derby, while along the west coast the country bristles with Norse names.

The people so diverse in origin are now united in one great nation, and, as the population increases so rapidly, many of them emigrate to find new homes in other lands, where they continue to speak their own language. As a result of this there has been formed by settlement and by conquest a vast empire that now includes one-fifth of the land and people of the world.

CHAPTER XIII

IRELAND

Ireland resembles Scotland in having two languages, English and Celtic, and in being very nearly of the same area. But Ireland is rounder and more compact than Scotland. It also has but few mountains, and these rise steeply from the sea in isolated patches, whereas the greater part of Scotland is over 600 ft. above sea-level. Being an island, Ireland can only be reached from England or Scotland by sea, and the people, therefore, have lived a life somewhat apart from that of the two sister kingdoms.

Plants, animals and races that have reached Great Britain have not reached Ireland. For example, there are no snakes there, and, as we have stated, the country does not appear to have been invaded by the broad-headed people of the bronze age.

The large area of high land in Scotland, which weathers into a poor soil, has forced nine-tenths of the population to gather in the central lowland, where the soil is fertile and where there are minerals. In Ireland, on the other hand, there are vast areas of lowlands which give opportunity for agriculture, and so the population is more evenly distributed. Nevertheless, where the coasts are near Britain, coal can be obtained, and this fact has made the population densest in the N.E. of Ireland. Belfast, the largest town in Ireland, has about half the population of Glasgow, the largest town in Scotland, and Dublin, the capital of Ireland, has less people than Edinburgh, the Scottish capital.

Ireland can be divided into four regions, which almost correspond to the four provinces. They are North (Ulster), West (Connaught), South-West (Munster), and the Centre (Leinster).

North Ireland is that part of Ireland where the principal manufactures are carried on. The river Erne, with its two lakes, separates the Donegal Mts. from the heights in which the Shannon rises. At the mouth of the river stands Ballyshannon, while Enniskillen stands at the head of the lower lake where the river is bridged. The county of Donegal is thinly populated because the height of the land makes agriculture almost impossible, the small population being employed in the granite quarries, tending cattle and sheep, and in cottage industries, such as tweed-making.

The peninsula of Inishowen (Owen's Island) lies between Loughs Swilly and Foyle, and is connected with the mainland by a lowland strip, while the peninsula itself has peaks over 2,000 ft., and the highland terminates in cliffs at Malin Head. Moville, at the entrance to Lough Foyle, is a port of call for Atlantic liners proceeding to or from Glasgow. Londonderry, still surrounded by its old walls, stands at the head of the lough. Its original name was Derry, London being added to it in the time of the Stuarts, because London citizens obtained so much land there. It is well known for the manufacture of linen and the making of shirts. In 1689 the city sustained a remarkable siege by the forces of the deposed King James II. Londonderry is connected by rail with Dublin, Belfast, Donegal, and Ballyshannon. The Sperrin Mts. lie to the south of the town.

Antrim is separated from the county of Londonderry by the river Bann and Lough Neagh. Almost the whole county con-

sists of highland, which reaches the sea in precipitous cliffs at Fair Head, within 13 miles of Scotland. The Giant's Causeway on the north is noted for its columnar basalt, which is exactly the same in structure as the basalt at the entrance to Fingal's Cave in the island of Staffa, off Mull. Near by are the watering-places of Portrush and Ballycastle, and a few miles from the shore is Rathlin Island. Larne, on the east coast, is in communication with Stranraer; this is the shortest sea-route between Great Britain and Ireland. At the head of Belfast Lough, into which flows the river Lagan, stands Belfast, the commercial capital of Ireland. Iron is found in the neighbourhood, coal can easily be obtained, and the inhabitants are more progressive than elsewhere in Ireland. Ships are built, linen manufactured, and a great amount of trade carried on.

This N.E. portion of Ireland is different from all the rest of the country. Although it includes only about one-fifth of the surface it produces one-third of the oats, one-third of the potatoes, and all the flax grown in the island. The population is, as we have said, also the densest. Armagh, which is inland, is the ecclesiastical centre both for Protestants and Roman Catholics. Donaghdey is in communication with Port Patrick in Scotland, but the stormy nature of the passage prevents its being used in all weathers. Lisburn, Lurgan, Newry, are engaged in the linen industry. Newcastle, in county Down, is a small seaside resort.

West Ireland.—The Shannon may be taken as the eastern boundary line of this division of Ireland, being, as a matter of fact, the boundary of Connaught between L. Forbes and L. Derg. Clare, though on the Connaught side of the Shannon, is in Munster, as it was easy to cross to it from Limerick. The far west of this region is very mountainous, and has a heavy rainfall. The inhabitants, who speak Erse, have a very hard struggle for existence. A little fishing is done at Westport on Clew Bay, Sligo on Sligo Bay, and Galway on Galway Bay, which is protected by Aran Is. Both Westport and Galway are connected with Dublin by the Midland Great Western Railway. Some of the people quarry the green marble of Connemara, but the majority look after flocks of horned sheep and herds of black cattle, or grow potatoes. The spinning and weaving of wool at home is being revived. The coast and mountain scenery is magnificent. Achill Island has cliffs of great height, but the Mullet Peninsula, at the north-east corner of Mayo, is low and flat.

Central Ireland consists of lowland, and in places the limestone of which it is composed has been worn into hollows in which the water has accumulated and bogs have formed, the largest of which is the Bog of Allen. The levelness of the land

makes it easy to construct canals and railways and has made Dublin the natural centre. The importance of Dublin's position is increased by the fact that it lies opposite to the Cheshire plain, which leads to London.

Dublin, with its port of Kingstown, stands on a fine bay, protected by Howth Head. It is in daily communication with Holyhead, and vessels run to Liverpool as well. There are distilleries and breweries in the city, and poplins are manufactured. It is the administrative centre of Ireland and has many fine buildings. Balbriggan, to the north of Dublin, is famous for its linen manufactures. Drogheda is a port that stands at the mouth of the Boyne, where in 1690 William III defeated James II.

The Shannon (225 miles) rises south of the hilly land in county Cavan. On its way it flows through three lakes, Loughs Allen, Ree, and Derg. These loughs contain wooded islands. Lough Allen is 168 ft. above sea-level, and is almost surrounded by hills. The Royal Canal that runs via Mullingar from Dublin joins the Shannon just above L. Ree, into which lake flows the Inny. Athlone stands at the southern end of the lake. The Suck flows into the Shannon to the south of this from the west, and the Brosna, with the Grand Canal, which runs from Dublin via Tullamore, join it from the east.

At the southern end of Lough Derg, which is 108 ft. above sea-level, stands Killaloe, near which are the Rapids of Castle Connell, known as the Leap of Doonas, which rapids are avoided by a canal. Limerick stands at the head of the long narrow estuary of the Shannon. It is the largest port on the west of Ireland, and exports dairy produce, imports wheat and maize, and makes lace. Ennis stands at the head of the Fergus that flows into the estuary.

Southern Ireland.—This includes the two tourist centres of Killarney and Wicklow. Although the west coast has some excellent harbours there are no ports on them owing to their distance from regions of dense population and to the difficulties of communication inland. Cork, at the mouth of the Lee, has the best harbour. Queenstown, which stands on an island in the harbour, is a port of call for Atlantic liners. The mails are landed here and sent by the G.S. & W.R. to Kingstown, from there by boat to Holyhead, and by the L. & N.W.R. to London (Euston).

Waterford trades with Bristol and other ports on the west of Britain; so does Wexford, which stands on the estuary of the Slaney. Rosslare is the outport of Wexford, from which steamers run to Fishguard. Wicklow and Bray are tourist resorts. Granite and slate are quarried in the Wicklow Mts.

CHAPTER XIV

SCOTLAND

Scotland can be divided into four regions: (1) The western islands, (2) the highlands, (3) the lowlands, and (4) the southern uplands.

The **Western Isles** or **Hebrides** consist of the Inner and the Outer Hebrides.

The *Outer Hebrides* are separated from the mainland by the Minch and Little Minch, which are smooth waterways, because the islands act as a natural breakwater. Lewis (county Ross) and Harris (county Inverness), North Uist, and South Uist are the largest of the islands. As the chagnels which separate these islands are very narrow the whole group is often spoken of as Long Island. The islands are composed of old rocks worn down into bare rounded hills, which in many places are covered with boulder clay. The soil is infertile, and the severe winds make the islands treeless. Fogs are frequent. The inhabitants make a poor living as fishermen and farmers, but during recent years home industries have been revived. Stornoway, on the east side of Lewis, is the only considerable town. It is a fishing station, and a packet steamer connects with Stromness.

Lying to the west of the islands is St. Kilda, one of the most lonely places in the British Isles, as it is only visited three or four times every summer by vessels from Glasgow. The few men of the island are bird catchers, while the women weave wool. Two hundred miles to the west of St. Kilda is the rock of Rockall, which is visited at long intervals by fishing boats.

The *Inner Hebrides* consist of the islands of Skye, Rum, Eigg, Mull, Islay, and Jura. The two small islands of Iona and Staffa are off the larger island of Mull, Iona being famous for the ruins of its cathedral and Staffa for Fingal's Cave, with its beautiful columns of basalt. Other islands of this group are formed of recent volcanic rocks.

The islands have a very heavy rainfall, and the soil is poor, being in many places strewn with glacial boulders. The inhabitants, who are few in number, spend most of their time in fishing and in keeping cattle, but here again home spinning and weaving is being revived. The district is becoming more and more a tourist centre. Portree in Skye, which is separated from the mainland by the Sound of Sleat, is a fishing station.

These islands, together with the Orkneys and the Shetlands, formed a Norse settlement, the lord of which had his seat of government in Iona.

Arran and **Bute**, lying in the Firth of Clyde to the east of

the peninsula of Kintyre, form one county, Arran being the larger island, but Bute the more important. Bute is separated from the mainland by the beautiful Kyles of Bute. Rothesay, on the isle of Bute, is the capital, and one of the largest of Scotch watering-places. Goat Fell (2,800 ft.) is in Arran.

Northern Islands.—*The Orkneys* are separated from the mainland by the stormy Pentland Firth. Like Caithness to the south they are composed of red sandstone, which in many places stands out as stack rocks, like the Old Man of Hoy, which is 450 ft. high. The climate is equable and the soil fertile, but too damp to grow anything but green crops. The severe winds make the islands treeless. The largest island is Mainland, on which stands Kirkwall, the capital, and Stromness, a fishing station.

The Shetlands lie to the north of the Orkneys; between the two groups is Fair Is. The Shetland Islands are composed of the same hard rocks as the Highlands, and in places come to the sea in cliffs of 1,000 ft., which are the home of thousands of sea-fowl. The climate is more severe than that of the Orkneys, and the chief occupations are cod-fishing and the rearing of ponies and sheep. The latter give a very soft wool, which is made into the famous Shetland shawls. The inhabitants are closely allied to the Scandinavians. Lerwick, on Mainland, is the only town of any size.

The Highlands.—The Highlands lie north of a line joining the Clyde to Stonehaven. They are composed of hard rocks which weather into a poor soil. This, together with the raw climate and heavy rainfall, makes the region thinly populated. The few inhabitants cultivate green crops and keep cattle and sheep, and have such a hard struggle to live that they are gradually moving to the more fertile region of the east coast, where the softer sandstone weathers into a richer soil and where the rainfall is less. The peasants are called *Crofters*. Their huts are made of stone with roofs of thatch, which are kept in place by heavy stones. The population is chiefly found in the valleys, where isolation bred in them a clannish feeling and helped them to cling to the ancient Roman Catholic faith.

The majority of the people of the Highlands are of Celtic origin, but in the north the people are of Scandinavian blood, Sutherland being the "south land" of the Norsemen.

The Northern Highlands include the counties of Caithness, Sutherland, Ross and Cromarty, half of Inverness, and a part of Argyll. Except in the north-east the land is chiefly deer forests, which in summer are purple with heather, trees being scarce. The majority of the population is found in Caithness and along the eastern shores of Cromarty. Here turnips and potatoes are grown, fish are caught, and the sandstone, which

forms the fine cliffs of Duncansby Head, is quarried at Thurso and Wick, both of which are also fishing stations. The Highland Railway winds its way north from Inverness, along the east coast to Wick and Thurso, with a branch at Dingwall for Stromness.

The **Grampian Highlands** lie to the south of Glenmore. The fishing villages in this district are crowded in the season with tourists. Oban, on the Firth of Lorne, which is the largest town in the west, is the chief tourist centre. Towards the east the hills become more rounded, the valleys are relatively few and lie high, while the only lakes are the small mountain tarns. Except at Stonehaven the highlands are flanked by a coastal plain, where corn and root crops are grown, and many cattle are kept. Here the majority of the population live.

The rivers flowing east, like most Scotch rivers, teem with salmon; they are rapid and difficult to navigate. The Spey (110 miles) has a wide valley known as Strath Spey, or Glen Spey, and it flows between the Monadhliath and Cairngorm Mts. The Dee is surrounded by the Cairngorm Mts. and Lochnagar. It is very difficult to pass from the Dee valley either to the valley of the Spey or that of the Tay. The Don empties its waters a few miles to the north of the Dee. The Tay (110 miles long) brings down a great volume of water and practically drains the county of Perthshire. The Tay valley is picturesque and contains many lakes. Communication between the Spey and the Tay takes place along the Garry by means of the Highland Railway. Southwards, this dissected plateau ends in a steep brink which runs across the country from S.W. to N.E.

Large numbers of tourists visit the Grampian Highlands, especially the Trossachs in the neighbourhood of L. Katrine. This lake is drained by the Leith, a tributary of the Forth. Callander is the tourist centre for this district. The only large towns are round the coast, that is, where the land is fertile, and where people can eke out a livelihood by fishing in the sea and the rivers. Aberdeen stands at the mouth of the Dee. Grey granite is quarried and fish are cured. Near by is Findon, famous for its haddocks. Red granite is exported from Peterhead, which is also a fishing station. Fraserburgh and Stonehaven are fishing stations, and Balmoral, in the valley of the Dee, is a royal residence.

The Lowlands.—This is the most thickly populated district of Scotland, containing more than half the population. The soil is very fertile, and, owing to the scientific training of its farmers, gives a good return for the labour expended. Iron and coal are also mined, which enables manufactures to be carried on. The

region is drained by the Forth and the Clyde, the latter being the most important river of Scotland. The estuary of the Clyde is the chief shipbuilding place in the United Kingdom. There is coal in the neighbourhood ; iron and timber can also be easily obtained. Glasgow, Port Glasgow, Greenock, and Dumbarton are the chief towns engaged in this industry.

Glasgow is the largest city in Scotland, and one of the most ancient. It was important in early days because it guarded the west route into the Highlands, but its importance was increased when the Clyde was deepened in 1768. The presence of coal and iron has assisted in fostering its manufactures, especially cotton and shipbuilding. It does trade with America and the West Indies. Stirling, on the Forth, near which was fought the battle of Bannockburn (1314), and Perth, on the Tay, were important in early days because they guarded the east route to the Highlands. Perth at one time was the capital of Scotland, and the kings were crowned at Scone, a few miles away. To-day it is a great railway centre, lines running via the Tay to the Highlands, via the Carse o' Gowrie to Dundee, via Strathmore to Aberdeen, across the Ochill Hills to the Forth Bridge and Edinburgh, and also to Stirling. The pure water of the Tay has made the town a centre for dyeing and whisky distilling.

Forfarshire includes Strathmore, or "the great valley," which lies between the Grampian edge and the Sidlaw Hills. The fertile Carse o' Gowrie (in Perthshire) is situated to the south of the Sidlaw Hills. Dundee on the Tay is the most important town ; the orchards of the Carse o' Gowrie gave rise to a jam industry, and later to the making of marmalade ; the facility for obtaining coal, flax, hemp, and jute also led to linen, etc., manufactures. Dundee still sends out Arctic whalers. Arbroath, Montrose, and Forfar also manufacture linen ; the coastal towns specialize in ropes and sailcloth.

Fifeshire lies between the Tay and the Forth, and its chief towns are near the coast. Cupar, the administrative capital, is an inland town, and the construction of the Tay bridge has made it a railway centre. St. Andrews is an old town, famous for its university, the oldest in Scotland, and also for its golf courses. Kirkcaldy and Dunfermline on the coast have linen and linoleum factories.

Lanarkshire is practically divided into two by the Clyde. The presence of coal and iron has made it a busy industrial centre. Ironworks are situated at Motherwell, Hamilton, and Coatbridge ; the latter also has oil shale. Motherwell makes locomotives and carriages. Falkirk in Stirling also manufactures iron goods. Glasgow is the most important town, and Lanark on the Clyde is the county town. The Lanarkshire

coal helps to supply the cotton mills of Paisley in Renfrewshire and the Clyde shipbuilding yards.

Ayrshire has a coalfield, and the coal is exported via Ayr, Ardrossan, and Troon, and used in the factories of Kilmarnock. Ayr is the county town, and is famous for its association with Robert Burns.

Edinburgh, the administrative, ecclesiastical, and intellectual capital of Scotland, grew up round one of the crags (the hard core of a long extinct volcano) of the lowlands. It was strongly fortified, because it guarded the route between the Pentland Hills and the sea. It has many famous buildings, and is considered to be one of the finest cities in Europe. The pure water has made it a brewing and distilling centre, while the paper-mills in the neighbourhood have helped to establish the great printing houses of the city. Leith, really a suburb of the capital, is its port, and has a large shipping trade. The Forth and Clyde Canal gives through water communication between the political and commercial capitals. Dunbar is built where the Lammermuir Hills compel the road to keep close to the sea. It was here in 1650 that Cromwell was caught by the Scots under Leslie, and, but for a false move on the part of the enemy, would have been delivered into their hands.

The Southern Uplands.—The southern uplands of Scotland consist of rounded hills of slate and shale, covered with heather moors and peat, mosses in the higher part, with grassy slopes on the lower. The rich pasturage makes excellent sheep runs, which, together with the water, led to the wool industry of Hawick, Galashiels, Peebles, and Selkirk. There are few trees, except in the sheltered river courses. The valleys or dales are often broad and are fertile, mixed farming being carried on. The past prosperity of Tweeddale is shown by the ruins of abbeys at Melrose (the finest in the kingdom), Dryburgh, Kelso, and Jedburgh, which were destroyed in the border wars. Sir Walter Scott, the greatest of Scotch writers, has made this district famous ; he lived for many years at Abbotsford on the Ettrick.

Dumfries is the most important town in the west upland region. From Dumfries the railway runs north to Glasgow and west to Galloway (Stranraer and Port Patrick for Ireland). Robert Burns is buried there, and Thomas Carlyle was born a few miles away. Moffatt, just under Hart Fell, is a tourist centre, having mineral springs ; while Gretna, at the head of the now drained Solway Moss, was in former days the scene of many runaway marriages.

Besides the woollen manufactories, there is a little lead mining and quarrying carried on in the uplands, but owing to the poor living the district is very sparsely populated.

CHAPTER XV

ENGLAND—THE NORTHERN COUNTIES

The Pennine Moors practically divide the eastern counties from the western counties, except in the case of Yorkshire, which follows some of the valleys far to the west. The presence of the Pennine Moors makes the eastern counties drier than the western counties.

Northumberland is all that remains of the old Saxon kingdom, which included all the land north of the Humber. It consists of a low strip of fertile land along the coast, which forms the natural route to the north, hence it was guarded with castles at Alnwick and Newcastle. The existence of ruins on Farne Islands and Holy Island show that in troubled times these islands were used as places of refuge. Sheep are reared on the moors, and lead is mined in some of the valleys, but the chief importance lies in the presence of coal and iron, which supports the iron, glass, chemical, and shipbuilding works of Newcastle.

Newcastle is the focus of routes, as the N.E. Railway follows the Tyne Gap to Carlisle, and crosses the Tyne on its way north to Berwick. Coal is the chief export. Gateshead is in reality a suburb of Newcastle in Durham. North Shields and Tynemouth in Northumberland, and Jarrow and South Shields in Durham are engaged in shipbuilding, and North and South Shields also do a little fishing. Hexham, at the confluence of the North and South Tynes, is a market town famous for the battle fought there in 1464.

Durham.—The county of Durham consists of moorland, on which sheep are fed, while lead is obtained from the hills. The broad valley of the Wear almost divides the county in two, and, on the river, almost in the centre of the county, stands the county town of Durham, with its cathedral on a hill overlooking the river, which runs round it on three sides. Sunderland, at the mouth of the Wear, has shipbuilding works for the same reasons as the Tyne ports. The Tees forms the boundary to the south, and, as this district is near the Cleveland iron mines of North Yorkshire, Stockton has an iron and locomotive works, and is the outlet for Darlington, an important centre on the North-Eastern Railway. Stephenson's first railway connected these two towns. The Hartlepools at the mouth of the Tees make sailcloth and trade with the Baltic in timber, etc.

Yorkshire is the largest county in England, and owing to its size it is divided, for judicial purposes, into three divisions, called Ridings, the North, East, and West. The West Riding

is the most important, because, owing to the existence of coal and water, the woollen industry is carried on there, and there is also an iron industry in the south of the Riding. The county consists of the moorlands of the Pennines to the west, the fertile valley of the Ouse in the centre, and the Yorkshire Moors and Yorkshire Wolds to the east, separated from each other by the valley of the Derwent. The peninsula of Holderness is low and flat.

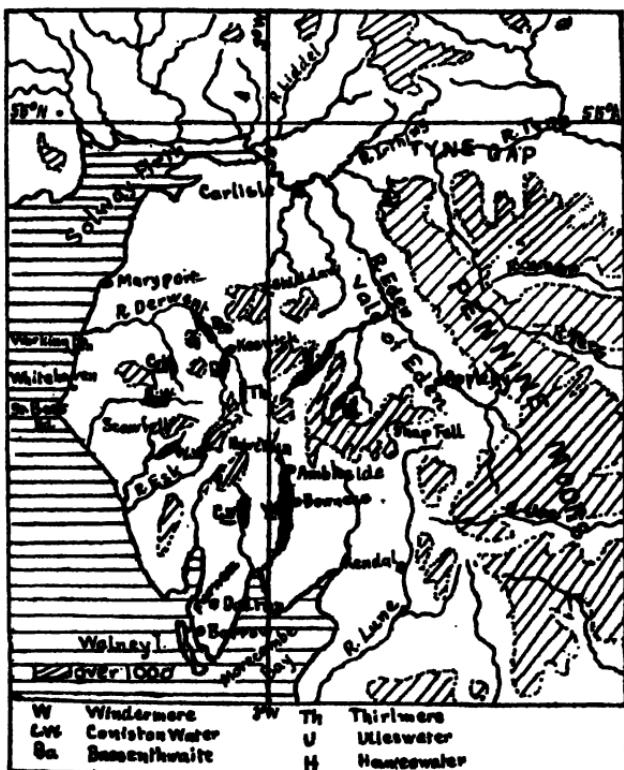
The Ouse is formed by the junction of the Swale and Ure, and is joined on the right bank by the Nidd, Wharfe, Aire (tributary, the Calder), and Don from the Pennines, all of which run in beautiful valleys in their upper courses. On the left bank of the Ouse is the Derwent, from the Yorkshire Moors, which flows through the Vale of Pickering. This region is agricultural, hence the majority of the towns here were originally market towns, or had cathedrals built in them.

York is the most important town on the Ouse. Owing to its position on the natural road to the north, where branch roads lead through the Vale of Pickering to the coast and through the Aire Gap to Lancashire, it has always been important, even in Roman times. It has a magnificent cathedral and the ruins of a fine abbey. To-day it is a great railway centre, and has cocoa and chocolate factories. Ripon, higher up the river, is another cathedral city and market town. Richmond, on the Swale, is a market town and agricultural centre. Near the mouth of the Ouse stand Selby and Goole, both agricultural centres. Goole also exports coal. Hull, on the Humber, is the largest port of Yorkshire. It trades chiefly with the Baltic.

The woollen industry is carried on in the valleys of the Aire and Calder at Leeds, Bradford, Halifax, Huddersfield, Wakefield, Keighley, Saltaire, and Barnsley. Leeds and Barnsley also make linen goods. Iron is smelted at Rotherham, and is used in Doncaster for making locomotives, and in Sheffield for making cutlery, owing to the fact that the millstone grit in that neighbourhood makes excellent grindstones. Middlesbrough, in the north of the county, is another iron-smelting town, utilizing the iron ore from the Cleveland Hills. Whitby, Scarborough, and Bridlington are watering-places and fishing stations. The county is served by the N.E.R., the M.R., which runs via the Aire Gap to Carlisle, the G.C.R., the G.N.R., and the Lancashire and Yorkshire Railway.

Cumberland consists of the broad fertile valley of the Eden, in which stands Carlisle, with its cathedral and castle on a river-girt rock guarding the route round the west of the Cheviots. To-day it is an important railway centre. The M.R. and the L. & N.W.R. connect with London, the N.E.R., via the Tyne

Gap, connects with Newcastle, while three Scotch lines go northward. Penrith, also in the valley of the Eden, is an agricultural centre. The Cumbrian Mts. are in the middle of the county. Skiddaw and Cross Fell are the chief peaks, and together with the lakes make up the beautiful Lake District that fills Westmorland, South Cumberland, and the northern part of Lancashire. The Lake District has been a favourite place



MAP 18.—SKETCH MAP OF THE LAKE DISTRICT.

for writers to dwell in. *Southern*, *De Quincey*, and *Coleridge* lived near *Derwentwater*, *Wordsworth* at *Grasmere*, and *Ruskin* on the banks of *Coniston*.

Keswick, at the foot of Skiddaw on Derwentwater, is the chief tourist centre in Cumberland. Plumbago used to be mined in the neighbourhood. Workington, Whitehaven, and Maryport on the coast are coal-mining towns.

Westmorland is nearly all moorland. Lead is mined in the hills, and granite is quarried, while farming is carried on in the valley of the Eden, where stands Appleby, the county town. The chief tourist centre of the county is Ambleside, at the north of Windermere.

Lancashire.—The district of Furness is separated from the rest of Lancashire by Morecambe Bay and the south of Westmorland. The northern portion of Furness is mountainous, and has one shore of Windermere. The presence of iron in the south has made Barrow and Dalton centres for iron goods and shipbuilding. The northern portion of the county of Lancashire is agricultural, and the county town of Lancaster, on the Lune, is situated in this neighbourhood, where the passage north is narrowest. Until after the Industrial Revolution Lancashire was thinly populated, but now the south is studded with coal and iron mining centres and cotton factories which have attracted a dense population.

Liverpool is the most important port, although but of recent growth. It is the outlet for the manufacturing districts of Lancashire and Yorkshire, and imports raw material needed by them as well as food products. Liverpool's chief trade is with America and West Africa. The city is connected with Birkenhead in Cheshire by a railway tunnel, and there is also canal communication with the Potteries. The Manchester Ship Canal allows vessels to pass on to Manchester, the great distributing centre for the cotton towns of Oldham, Rochdale, Burnley, Blackburn, Preston, Chorley, Wigan, Bolton, and Bury. The making of machinery for use in these towns is carried on at Manchester, Rochdale, and Bury. St. Helens, Widnes, and Warrington are engaged in the manufacture of glass or chemicals, by utilizing the salt of Cheshire. Blackpool and Southport are seaside resorts, and communication with Ireland is carried on via Liverpool, Heysham, and Fleetwood.

Cheshire.—The greater part of this county is lowland, wedged in between the Cambrian Mts. and the Pennine Moors, and as it leads towards London it has always been important and guarded. Chester, on the Dee, was the ancient guard town. It is an old Roman station, has a cathedral, and is now a railway centre. A more important railway centre to-day, however, is Crewe, which is built where the L. & N.W.R. divides, lines leaving for Carlisle and Scotland, Manchester and Liverpool, and for North Wales and Holyhead. The lowness of the land, together with the fact that it lies to the west of the Pennines and so has a heavy rainfall, makes Cheshire rich in pasture land. It is the only county in England that has more cattle than sheep per thousand acres. The luxuriant pasture on the soil of the red

sandstone makes the milk rich in quality and suitable for the making of cheese. The dampness of the county also makes it possible for cotton-spinning and weaving to be carried on at Stockport, Dukinfield, and Hyde. Silk-weaving is carried on to a small extent at Macclesfield, Congleton and district, but the industry is waning. Salt is mined in the valley of the Weaver, where Droitwich is a centre. This salt has helped to give rise to soapmaking at Birkenhead in the Wirral Peninsula, where palm oil is obtained from West Africa. Birkenhead, in reality a suburb of Liverpool, also engages in shipbuilding. New Brighton, to the north of Birkenhead, is a seaside resort.

CHAPTER XVI

THE EASTERN COUNTIES

This part of England is characterized : (1) By its flatness, the only hills being the chalk escarpment of the Chilterns, East Anglian Heights, and Lincolnshire Wolds ; (2) by its small rainfall and a consequent large amount of sunshine ; (3) by the absence of minerals ; (4) by the presence of boulder clay on its surface. The coastline in nearly all parts is low, and is being slowly eaten away by the sea.

The eastern counties must therefore be the home of the farmer, except in that corner of Essex, near London, where industries are carried on.

Lincolnshire.—The Fens extend along the coast, although the name is generally restricted to the "Holland" district. Gt. Grimsby is the only important coastal town, being a great fishing station, and doing a large trade with the Baltic region. Boston and Spalding were busy ports before the rivers were silted up. Skegness is a seaside resort. The rest of the county is agricultural, sheep being reared on the Wolds. Lincoln, Grantham, and Gainsborough are the chief centres. Agricultural machinery is also made at these towns. Lincoln, with its cathedral on a river-girt rock having a commanding view of the country, is the county town. Immingham, a new port, situated a little to the north of Gt. Grimsby, and on the estuary of the Humber, will probably become very important.

Rutland is the smallest county in England if London is excepted. The majority of the land is pastoral or agricultural. Oakham is the county town. Uppingham has a large public school.

Northampton consists of fenland in the north and upland in the south where the limestone ridge crosses the county. Peter-

borough is the chief town in Fenland, built where the land was drained. Its cathedral has a commanding view, the cathedrals of both Ely and Lincoln being visible from its roof. The limestone hills support pastoral industries, which give rise to a leather and boot and shoe industry at Northampton, Wellingborough, and Kettering. The first two also make machinery for the boot and shoe trades. The Avon, which flows to the Severn, the Cherwell to the Thames, and the Welland and Nen which go to the Wash, all rise in the county, forming natural roads out in all directions; hence the battle of Naseby was fought in this neighbourhood.

Huntingdonshire consists of fenland in the east and a clay plain in the west. The Great Ouse flows across the southern part of the county. It is a typical dairy county, with Stilton as the cheese-making centre. The chief towns, viz., Huntingdon, St. Neots, and St. Ives, are small, and are situated on the Ouse.

Bedfordshire.—The chalk escarpment of the Chilterns runs through the southern part of the county, while the Ouse practically divides the county in two as it flows across the clay plain, which was once famous for wheat, the straw of which was especially tough and led to a straw-plaiting industry at Luton and Dunstable, which towns to-day, however, rely chiefly upon imported straw for the manufacture of hats. As Luton stands where the Lea, a tributary of the Thames, flows through the Chilterns, it has become a railway centre, the Midland Railway utilizing that gap to cross the chalk barrier. Bedford, the county town, is situated at the head of the navigation of the Great Ouse, and contains some noted schools.

Cambridgeshire consists almost entirely of fenland, the lower chalk escarpment of the Gog Magog Hills running across the southern part of the county. The Nen drains the northern party of the county, while the Great Ouse, with its tributary the Cam, drains the centre and southern portions. The Bedford Level Canal also runs across the county. The northern portion of the county forms the Isle of Ely, in which Hereward the Wake made his gallant fight against the Normans. The cathedral city of Ely stands on a hill above the fens of the Great Ouse, and overlooks the country for miles. Cambridge on the Cam is famous for its ancient university. Newmarket, in the east of the county, is a racing village.

Norfolk naturally falls into three divisions: (1) Fenland round the Wash, (2) the chalk escarpment of the East Anglian heights, and (3) the Broads in the south. The chalk is in many places capped with sand, which gives an excellent soil for barley and turnips, while sheep are reared on the downs. These downs provided the wool which was used by the early Flemish

settlers to weave into cloth at Norwich and the neighbouring village of Worstead. Where the chalk reaches the sea stand the seaside resorts of Hunstanton to the west and Cromer to the east. King's Lynn, on the Ouse, was once a port, but is now only a small railway centre. Norwich, the county town, with its cathedral, stands at the confluence of the Yare and Wensum. It was once a port, but is now situated many miles inland. All that is left of its once important wool trade is the manufacture of silk crape. Mustard is made in the city from the plants that grow so well on the fenland along the Great Ouse. Agricultural machinery is also manufactured.

The Broads, teeming with wild fowl, are visited by a great number of tourists during the summer. Yarmouth, at the mouth of the Yare, is the chief centre of the herring fishery and a popular seaside resort.

Suffolk very closely resembles Norfolk with its chalk downs in the west, where people lead a pastoral and agricultural life, and the chief market towns are Bury St. Edmunds and Stowmarket. The coastal region is low, and the coast is gradually being washed away, especially round Aldeburgh. The encroachments of the sea account for the wide estuaries of the Orwell and the Stour. Ipswich, the county town, manufactures agricultural machinery, and is also a railway centre. Along the coast stand the seaside resorts of Felixstowe, Aldeburgh, Southwold, and Lowestoft. Lowestoft also takes a great part in the herring fishery.

Essex consists of chalk downs in the north-west and an undulating clay land, the higher land being where the clay is capped with sand or gravel, as at High Beech and Laindon Hill. The land along the sea-coast and the banks of the rivers Thames and Lea is mostly marsh land. The sea-coast is deeply indented with many creeks and fringed with swampy islands, which are protected by dykes. As a matter of fact much land has been reclaimed both from the sea and from the River Thames by the building of these dykes. The coastal region is practically useless except for the watering-places of Southend, Walton, and Clacton, and the artillery station of Shoeburyness. Harwich, with a large Continental trade, stands on harder rock on the Stour estuary. Salt is made at Maldon, and cement is manufactured at Purfleet and Grays, where chalk crops out north of the Thames. Oysters are cultivated in the creeks along the east coast between Colchester and Maldon. Essex was once a great wheat land, but now most of the land is under pasture, with market gardens near London. Saffron is grown round Saffron Walden; turnips, barley, hops, peas, and beans are also cultivated. The cultivation of barley and the nearness of the Kent hop-

fields has given rise to breweries at Romford. Chelmsford, in the middle of the county, is the natural county town and an old agricultural centre. Colchester, on the Colne, is a railway junction, and has fine Roman ruins. By far the most important part of the county is the S.E. corner, near London, where stand the busy manufacturing town of West Ham, and the suburbs of Leyton, Woodford, Barking, etc., near Epping Forest.

Hertfordshire.—The chalk ridge crosses the county towards the north, and all the southern part of the county consists of London clay, and forms part of the London basin. There are cappings of gravel in places near the Lea, a tributary of the Thames. The clay rises into a ridge in the south, known as the Barnet Ridge. The Lea and Colne, tributaries of the Thames, flow across the county, and the New River, which was begun by Sir Hugh Myddleton in the year 1609, to supply London with water, flows through the southern part of the county, leaving the Lea between Ware and Hertford, and making use of the springs at Amwell. The county is agricultural, and produces fruit, flowers, vegetables, and lavender, besides wheat and pasture. Before the coming of railways the chief towns were the market centres of Hertford, the county town, situated on the banks of the Lea, Ware, situated, in the time of the Danes, at the limit of navigation of the Lea, and St. Albans, famous for its magnificent and ancient cathedral. To-day the most important towns are the railway centres of Hitchin (G.N.R.), Watford (L. & N.W.R.), and St. Albans (M.R.).

Middlesex forms part of the London basin, and consists of undulating clay lands, rising to heights where the clay is capped with sand or gravel, as at Hampstead, Highgate, and Harrow (famous for its public school). The county once grew a large quantity of wheat, but now it is chiefly pasture, market gardens, and brickfields. Brentford, on the Thames, is the county town, and is still only a small town. Staines, Twickenham, and Teddington, on the Thames, are really suburbs of London.

London is situated on the estuary of the Thames at the lowest point where the river is bridged. The Thames estuary faces the Continent, with which most of our early trade took place. Ships came across the North Sea and as far up the estuary as they could (*i.e.* to London Bridge) and unloaded. The goods were dispatched to different parts of the country either by smaller vessels above the bridge, or along the excellent system of roads (now railroads) that radiated from London. It was trade that made London and gave it power. Industries sprang up, and to-day every kind of goods is made there. When the seat of government was shifted from Winchester to London that added to the city's importance. The increase of trade has continued,

and the Thames is lined with docks and quays for many miles, while the increase in the size of modern ships has made it necessary to have docks nearer the sea at Tilbury, so that much larger vessels may unload. London is a marvellous city, with its huge population, its industries, which are mainly restricted to different areas (e.g., cabinet-making in Curtain Road, Finsbury, jewellery in Clerkenwell, leather in Bermondsey, etc.), and its magnificent buildings (St. Paul's Cathedral, Westminster Abbey, Houses of Parliament, Tower of London, etc.), its rich museums, and its tube railways. There are really three Londons. There is the City of London, covering little more than a square mile, swarming during the day with a hurrying crowd of people, but at night almost deserted. There is the County of London, which includes the cathedral cities of London, Westminster, and Southwark, and there is the larger area served by the metropolitan police.

CHAPTER XVII

THE COUNTIES OF THE THAMES BASIN

The Thames forms the boundary between Oxford, Buckinghamshire, Middlesex, and Essex to the north, and Berkshire, Surrey, and Kent to the south. The land in these counties is low near the river, rising to chalk hills to the north and south, except in Oxfordshire, where the hills are of limestone. The area enclosed between the North Downs and the Chiltern Hills is chiefly of clay, and forms what is known as the London Basin, where the highest points are where there are cappings of sand and gravel. To the south of the North Downs is the Wealden area.

Buckinghamshire includes : (1) The lowland by the Thames, where is situated Eton with its public school, and Great Marlow ; (2) the Chiltern Hills ; (3) the Vale of Aylesbury ; and (4) the valley of the Great Ouse, separated from the Vale of Aylesbury by a belt of rising ground.

Where the Chilterns are capped with sand and gravel there are beech woods, which led to the establishment of chairmaking at High Wycombe. The pure water in the streams that come down from the Chilterns has established paper mills at Chesham and at High Wycombe.

The Vale of Aylesbury, drained by the Thame which flows to the Thames, is one of the richest grazing areas in England, and the chief occupations here are dairy farming and the rearing of poultry. Aylesbury, in the centre of the valley, is the county

town. Agriculture is the occupation in the valley of the Great Ouse, where the wheat straw has given rise to a straw-plait industry at Buckingham and Stony Stratford.

Oxfordshire consists of : (1) The Chilterns, which come close to the Thames at Henley and Goring, where the valley of the Thames is very narrow ; (2) the clay valley of Oxford, drained by the Thames, Thame, Cherwell, Evenlode, and Windrush ; and (3) the slopes up to the limestone escarpment of Edge Hill. The limestone escarpment supplies pasture for sheep, and has beech forests. The wool was utilized at Witney for the manufacture of blankets, most of which are now made in Yorkshire and Wales. Woodstock and Chipping Norton make gloves. Banbury, noted for its cakes, commands the route north to Leamington, Warwick, Birmingham, etc., via the Cherwell valley. Oxford, on the Thames where it is joined by the Cherwell, is the chief town in the county. It has an ancient university and is a railway centre.

Berkshire includes : (1) The Vale of White Horse ; (2) the Marlborough Downs ; (3) the Kennet valley ; and (4) lowland to the east.

The lowland district is well wooded, and ends in the forests of Windsor, which add to the beauty of the Thames between Maidenhead and Windsor, where one of the royal castles is situated.

The Kennet valley is followed by the G.W.R. main line to the west, which runs via Newbury from Reading (the county town), which is an important railway centre and manufactures biscuits. The Kennet and the Severn are connected by a disused canal.

Wantage, the birthplace of Alfred the Great, is situated in the Vale of the White Horse, which is extremely fertile, Abingdon being the agricultural centre. The G.W.R. line from Didcot to the west follows this valley, so does the Berkshire and Wiltshire Canal, which connects the Avon and Thames.

Surrey and Kent, except along their northern portions, are included in the Wealden area.

CHAPTER XVIII

THE WEALDEN AREA

The Weald extends through Surrey, Sussex, and Kent. In reality the word Weald is restricted to the valley which lies between the North and South Downs, and it gained this name because in past times it was well wooded, the word *Weald* meaning "wood." The chalk escarpments here run east to

west with their steep faces towards each other, but towards the west they run together, and would enclose an oval area if it were not for the break at the eastern end made by the Strait of Dover, for the chalk is found in North France to complete the oval. Within this chalk escarpment, and running almost parallel to it, is an escarpment of sandstone, the so-called greensand. This is well seen in the north at Sevenoaks, Leith Hill (965 ft.), and Hindhead (895 ft.), but is scarcely represented in the south. Towards the east another hilly district is found in the centre, called the Forest Ridge (Crowborough Beacon, 804 ft.). This is composed of sandstone, sand, and clay.

There was a time when the chalk of the North Downs was continuous with that of the South Downs, as shown by the dotted lines in Diagram 19, when they formed a huge arch sinking into a trough in the north and south, in which clays were deposited. The top of this arch gradually got worn away, and as the disintegration continued the escarpments were formed, while the more resistant sands of the centre were left



DIAGRAM 19.—DIAGRAMMATIC SECTION ACROSS THE WEALD.

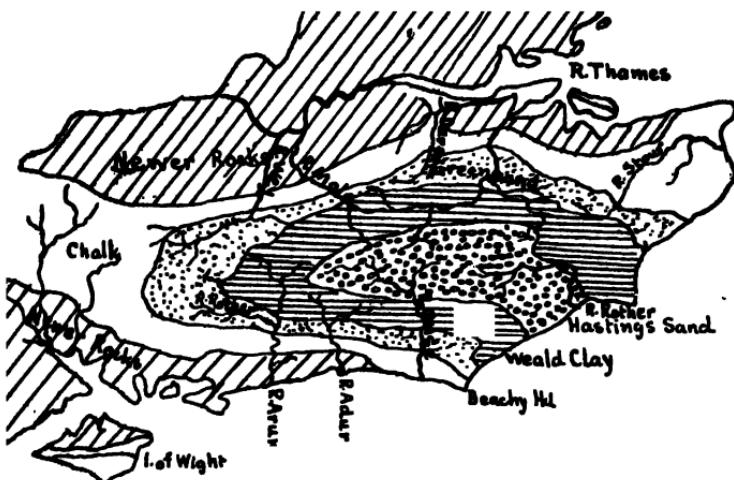
standing out as hills. The rivers show that the highest land must have been in the centre, for, instead of rising in the Downs, they rise in the Weald, which is lower than the Downs, and flow through the chalk hills in deeply worn valleys.

These valleys, because they gave an easy means of communication, had roads, and, later, railways taken through them, and towns sprung up at these gaps in order to guard them and command the trade. The Wey, Mole, Darent, Medway, and Stour break through the North Downs. Guildford commands the Wey Gap, Dorking the Mole Gap, Dartford the Darent Gap, while in the case of the Medway and Stour, owing to the increase in width of the Downs towards the east, the gap is guarded by a town at each end, e.g., Maidstone and Chatham on the Medway, Ashford and Canterbury on the Stour.

The Arun, Adur, and Ouse break through the South Downs, which terminate in the chalk cliffs of Beachy Head. Arundel, with its castle, guards the gap of the Arun, and Lewes the Ouse Gap.

The Downs, except where there are gravel or sand cappings,

are almost treeless, forming pasture for sheep ; beech and pine woods are found where there is enough soil. As chalk is porous no villages are found on the hills, because of the scarcity of water. The water sinks through and comes out as a line of springs where the clay unites with the porous rocks, and it is here that villages are built, *e.g.*, Charing, Malling, etc. Many village names also call attention to the time when the sandstone yielded iron ore, which was smelted with charcoal obtained from the forests. This was once a great iron-smelting district, and the requirements of the furnaces helped to destroy the forests. Fullers' earth is obtained from near Redhill, much of



MAP 20.—GEOLOGICAL SKETCH MAP OF THE WEALD.

the harder rock is used for road metal, the clays are used for brick-making, coal is being mined at Dover, but the chief occupation of the Weald is agriculture.

Surrey.—The northern portion of this county consists of London clay, and along the Thames are the river-side towns of Richmond and Kingston. Croydon, really a suburb of London, is situated in this area. Epsom, famous for its racecourse, is in the east, where the Downs widen considerably ; while in the west they get narrower, forming the Hog's Back to the west of the Wey.

Guildford, the county town, is on the Wey, and Dorking commands the Mole Gap. Redhill and Reigate are situated at the foot of the chalk escarpment. Godalming, on the Upper

Wey, is an agricultural centre of the Weald, and nearness to London has made it the seat of Charterhouse School.

Kent.—The Downs run across the county, increasing in width towards the east, where they terminate in the chalk cliffs of Margate and Dover. Along the coast stand the seaside resorts of Herne Bay, Margate, Ramsgate, Broadstairs, Deal, Walmer, Dover, and Folkestone. Dover was one of the original Cinque Ports. The other three Kentish Cinque Ports, namely, Romney, Sandwich, and Hythe, are now of little importance, their harbours having silted up. Along the Thames coast stands Gravesend, and, at the mouth of the Medway, Rochester, with its cathedral and castle. Chatham with its dockyards is also at



MAP. 21.—SKETCH MAP OF THE WEALD.

the mouth of the Medway. The Thames estuary is guarded by Sheerness on the Isle of Sheppey. Cement is made at Gravesend and along the Medway. Oysters are cultivated at Whitstable on the Swale estuary.

The north-west corner of the county is filled with suburbs of London, e.g., Bromley, Beckenham, and Chislehurst. The chief products of the interior of the county (part of the Weald) are hops and fruit. Maidstone on the Medway is the county town. Canterbury on the Stour has historical associations and a magnificent cathedral, the seat of an archbishopric. The river Stour once had two mouths, thus making Thanet an island, but now it has only one, which enters the sea near Sandwich.

Tonbridge and Ashford are railway centres. Tunbridge Wells, with its mineral springs, is an inland health resort, situated amongst beautiful scenery. Lyddite is made at Lydd, on Romney Marsh, near to Dungeness. The Marsh is unhealthy, but sheep are reared on it.

Sussex includes part of the Weald, the South Downs, and a sheltered coastal land. Lewes, the county town, is situated on the Ouse, where it breaks through the South Downs. Horsham and Cuckfield are situated in the north of the county on the Weald. Christ's Hospital School has been moved to Horsham. The coastal towns, viz., Hastings, Eastbourne, Brighton, Worthing, Littlehampton, and Bognor are seaside resorts, while Newhaven is a packet station with steamers running daily to Dieppe. Chichester, which is a few miles inland, is a cathedral town.

CHAPTER XIX

THE SOUTH-WEST OF ENGLAND

Hampshire has chalk hills in the north, where the North and South Downs unite and run on towards Salisbury Plain. In the west of the county there is an offshoot of these Downs which runs southward. The chalk ridge that runs from E. to W. of the Isle of Wight, which is separated from the mainland by the narrow straits of Spithead and the Solent, was once continuous with the chalk ridge of Dorsetshire. These chalk ridges enclose another basin like the London basin, only not so extensive nor so completely shut in, but, like the London basin, clay fills this area, which sinks to an alluvial plain along the coast. The Itchen and Test flow across the county and unite to form Southampton Water, on which stands the great port of Southampton, which trades chiefly with South Africa. The entrance to this waterway is guarded by the naval station of Portsmouth, which stands on an excellent harbour, the entrance to which is guarded by forts and mines. Portsmouth is so strongly fortified that it is considered to be impregnable. The Wiltshire Avon, which is joined by the Stour, flows across the west of the county, and the New Forest lies between Southampton Water and the Avon.

Basingstoke, an important junction on the L. & S.W.R., guards the entrance from the Thames valley to the valley of the Test. Winchester, on the Itchen, which has the advantage of a central position, was the old capital of Wessex, and has a wonderful history. It is the seat of a bishopric, and has a great public school. Aldershot and Farnborough

are on heather-clad commons which are used for military manoeuvres, and large barracks have been erected here to guard the route to London.

Agriculture is the chief occupation of the people of the county, but along the coast people get part of their living from the visitors who spend their holidays in Bournemouth, Christchurch, Southsea, and Ryde, Sandown, Shanklin, and Ventnor in the Isle of Wight.

The Channel Islands, the largest of which are Jersey and Guernsey, are attached to the diocese of Winchester. They lie in the bay between the Cotentin Peninsula and Brittany in North France. Communication with the islands is carried on via Southampton and Weymouth. St. Helier, in Jersey, is the chief market, and St. Peter Port, in Guernsey, the chief port. The chief products are fruits and vegetables, large quantities of which are exported to the British Islands.

Wiltshire contains Salisbury Plain, the centre of the chalk system, from which run out the North and South Downs, the Marlborough Downs, continued beyond the Thames as the Chiltern Hills, and the chalk hills of Dorsetshire. Rivers flow out in all directions, hence it is the meeting-place of routes. Sheep are reared on the hills, the wool being utilized for the manufacture of carpets at Wilton, and cloth at Bradford, Westbury, and Trowbridge. Wilton was the old capital of the county, because it commanded the route along the Wily, Avon, Bourne, and Nadder. The seat of administration was then moved to Old Sarum, and afterwards to Salisbury, as Old Sarum was in too exposed a position. Salisbury cathedral has the highest spire in the country. Not far away on the plain stands Stonehenge, a wonderful collection of megaliths probably erected towards the end of the Stone Age. In the north of the county stands Marlborough with its public school, and Swindon, at the entrance to the Vale of the White Horse, which accounts for its importance as a junction on the G.W.R. The town practically depends upon this railway for its existence, the company having their works there.

Dorsetshire consists almost entirely of chalk hills, which form ranges in the north and south. To the south of the chalk, limestone appears in places, as at Portland and Purbeck, and in places the sea has broken through this limestone and flooded the valley between the limestone and the chalk ridge, making beautiful coves like that at Lulworth. There is splendid scenery along the coast. Portland Bill, which is connected with the mainland by the Chesil beach, a bank of shingle thrown up by the sea, protects Weymouth harbour, making Weymouth a naval and packet station and a small fishing town. St. Alban's

Head protects Poole Harbour in the east of the county, from which clay is exported for use in the Potteries. The greater part of the county is given over to agriculture and dairy farming, but quarrying is carried on at Portland and Swanage. Sherborne makes gloves and has a public school. Dorchester, the county town, is built where the only passage across the hills is commanded by a river-girt hill. This site has been important from early British days. The remains of a Roman camp are to be found in the neighbourhood.

Somersetshire consists of a hilly country (the Mendip Hills, the Quantock Hills, and Exmoor), and the low fen-like valley of the Parret where Athelney is situated, and where the battle of Sedgemoor (1685) was fought. The county is a land of rich farms and orchards, a small amount of mining is carried on, stone is quarried in the neighbourhood of Bath, cloth is manufactured at Frome, and gloves at Yeovil. The county town, Taunton, on the main line of the G.W.R., stands on a slight hill above the Tone, and commanded the most fertile part of the plain until other land was drained. Bath has a fine abbey, and the hot springs which were known in Roman times have made it a fashionable winter resort. The city commands the Avon valley and the passage round the Cotswolds. There is a cathedral at Wells, ruins of an Abbey at Glastonbury, and Cheddar is famous for its gorge, caves, and cheese. Along the coast are the seaside resorts of Weston-super-Mare, Minehead, and Watchet.

Devonshire includes Exmoor, Dartmoor, and a lowland district across the county following the valleys of the Exe and Taw. Exmoor is a treeless uninhabited waste with many bogs, and is only famous for hunting, but it shelters Ilfracombe, Lynton, and Lynmouth, and helps to make a picturesque coastline. Dartmoor is a treeless granite waste with many bogs. It is practically uninhabited, but is a resort of tourists during the summer. The granite has been quarried in places, London Bridge being built of Dartmoor granite. Iron, tin, and copper mining have been attempted, but generally without much success. Many interesting ruins of prehistoric times are to be found on the Moor.

The disintegration of the granite has given rise to deposits of clay among the valleys of the rivers, especially along the Teign valley, and this has led to the manufacture of the so-called Devonshire ware. This clay is also exported to the Potteries. The difficulty of crossing the Moor has led to the establishment of a prison at Princetown. The chief towns near the Moor are Tavistock, Okehampton, Totnes, and Bovey. Sheep and ponies graze on the moorland.

The rich red soil of the lowland district, derived from the red sandstone, gives fine quality pasture, and leads to the preparation of cream and junket, of which Exeter and Tiverton are the chief centres. The county has also many apple orchards, and so Devonshire is renowned for cider. The mild equable climate of the south coast, together with its sheltered position, has given rise to the resorts of Sidmouth, Exmouth, Teignmouth, Torquay, Paignton, and Dartmouth, at the mouth of the lovely Dart. Marble and slates are quarried in the southern part of the county, especially near Torquay. The deeply indented coast, with its many safe harbours, *e.g.*, Bideford, Barnstaple, Brixham, and Dartmouth, has made Devonshire noted for its fishermen and sailors. Plymouth, on the Tamar estuary (a drowned valley), contains dockyards, and some liners make it a port of call. Exeter, standing at the head of the navigation of the Exe, is the county town, and is an important railway junction both for the G.W.R. and the L. & S.W.R. It has a fine cathedral, and many buildings associated with the names of great seamen. Lace is made at Honiton, and a few carpets at Axminster in the east of the county, but these industries are not so prosperous as they used to be.

Cornwall consists of barren moorland rising to granite tors. The highland comes close to the coast and gives the county a picturesque rocky coastline. The majority of the population is round the coast, where the people engage in pilchard fishing, as at Falmouth, Penzance, and St. Ives. There is tin mining at Redruth and Camborne, clay is obtained at St. Austell, and granite at Penryn, and agriculture is carried on in the valleys.

Launceston, on the Tamar, is in the centre of cherry orchards. Bodmin, on the Camel, commands routes, and Truro, on the Fal, is a cathedral city.

The **Scilly Isles** lie to the south-west of Cornwall; they consist of about 150 islands of granite, of which only five are inhabited. Early vegetables, flowers, and fruit are the chief products, which are sent from St. Mary, the chief town, to Penzance.

CHAPTER XX

THE MIDLAND COUNTIES. I

Shropshire.—The Severn divides the county in two. The northern half forms part of the Cheshire plain, and, as it has less rain than Cheshire, being sheltered by the Welsh Mts., it grows more wheat; the southern half is hilly. The Clee Hills rise to over 1,800 ft., while overlooking the Severn is

the sugar-loaf peak of The Wrekin (1,342 ft.). Oswestry is the largest town in the northern half of the county, and is connected by the Cambrian Railway, via the Dee and Upper Severn, with towns on the Welsh coast. Shrewsbury, on the Severn, is the county town. It is an important junction, and standing as it does at the head of a natural route into Wales, was the scene in early times of many border battles. Coalbrookdale and Ironbridge are mining towns on the coalfield near the Severn.

Worcestershire.—The Severn flows across the county, and the Warwickshire Avon joins it from the east and the Teme from the west. The valley of the Severn is very fertile, and produces, hops, fruit (apples, pears, and plums), barley, etc. In the west rise the Malvern Hills, which with their springs, fine scenery, and pure air have made Malvern a popular inland health resort. The Clent Hills in the N.E. overlook a corner of the Black Country, where Dudley, Bromsgrove, Redditch, Stourbridge are situated. Kidderminster, on the Severn, has carpet manufactories. Worcester is the county town, and by its position commands the Severn and Teme valley routes into Wales and the Avon route into the Midlands. On account of this, many battles have been fought in its neighbourhood, e.g., the battles of Worcester and Evesham. Being the meeting-place of routes, it has become an important railway junction. The city has a fine cathedral, and manufactures gloves and sauce.

Herefordshire.—The beautiful river Wye flows across the county, which has a rich red soil producing splendid pastures for cattle, and also apples and hops. Hereford, the county town, situated on the Wye, is a cathedral city, and manufactures cider. It is also a railway junction. Ross is the centre for the Wye valley.

Monmouthshire.—The Usk flows across the county, while the Wye forms the E. boundary between the county and Gloucestershire. The valleys of both rivers are fertile and produce fruit and hops, while the land lying between the two rivers is full of historic interest, for here are Tintern Abbey and Caerleon-on-Usk. The western half rises to the South Wales Mts., and has the mining towns of Tredegar, Ebbw Vale, and Pontypool. Abergavenny stands at the foot of the Sugar Loaf. Near the coast are Chepstow, at the mouth of the Wye, and Newport, at the mouth of the Usk. Newport is an outlet for that region, and has a share in the West African trade. It also exports coal. Monmouth, the county town, is on the Wye.

Gloucestershire includes the Forest of Dean, the Cotswold Hills, and a lowland district. There are small coalfields in the

Forest of Dean and round Bristol. Bristol was in olden times a very important port, because it commanded an easy route into the Thames valley, and so to London. Its trade is reviving again, owing to the construction of docks at Avonmouth and the growth of the West Indian fruit trade. The sheep pastures of the Cotswolds, together with the pure water of the Frome, led to the establishment of a cloth industry at Stroud. The east slope of the Cotswolds is given up to agriculture, and in its midst Cirencester is situated. Gloucester, the county town, can be reached by ocean-going vessels via the Berkeley Canal, and is the lowest point at which the Severn is bridged. It commands the routes into Wales and the Midlands, so was a natural site for a cathedral and a city. Cheltenham to the N.E. is an inland watering-place. •

Warwickshire includes : (1) The plain of the Upper Avon, and (2) a part of the Black Country in the N. The valley of the Avon is an agricultural district, in which stands Warwick round its river-girt rock. Leamington, an inland watering-place, is situated near the springs at the foot of Edge Hill. Rugby, higher up the river, has a public school, and is a railway centre on the L.N.W.R.

Birmingham, the centre of the iron trade, is in the northern part of the county ; so also is Coventry, where silk was once woven, an industry which has given place to the making of bicycles and motor-cars. Stratford-on-Avon is the birthplace of Shakespeare. Kenilworth is historically associated with Queen Elizabeth, who was once magnificently entertained at the castle by the Earl of Leicester.

CHAPTER XXI

THE MIDLAND COUNTIES. II

THE TRENT BASIN.

Derbyshire consists of plain in the south, across which flows the Trent, joined by the Dove, which forms the boundary between Derbyshire and Staffordshire, and the Derwent, which comes from the mountainous district in the north. This mountainous district is made up of the end of the Pennine Moors and the Peak district. Limestone comes to the surface, and, therefore, there are caves and caverns, and the rivers flow in gorges. The scenery, the springs, and pure air have made Matlock and Buxton tourist resorts. Lead is mined and building stone is quarried. The Derwent valley is followed by the Midland line

from Derby to Manchester. Glossop, in the north-west corner, makes cotton goods, and the extension of the Yorkshire coal-field into East Derbyshire has rendered Chesterfield and Derby important. Derby, noted for its porcelain factory, is the county town, and, as it commands routes, it has become the centre of the Midland railway, who make their rolling stock there.

Staffordshire includes : (1) The Potteries in the north, (2) the agricultural plain of the Trent in the centre, and (3) the Black Country in the south. The presence of coal and clay in the north of the county led to the establishment of the pottery industry, which now depends upon imported clay that reaches the neighbourhood by canal from the Mersey. Burslem, Hanley, Stoke-on-Trent, Etruria, Newcastle-under-Lyme, and Longton are the chief towns connected with the pottery trade. The plain of the Trent has fine pasture land and barley is grown. The fine pasture is responsible for the creation of a leather industry at the county town of Stafford, and the barley has helped to establish breweries at Burton-on-Trent. The richness of this district is shown by the presence of Lichfield cathedral. Wolverhampton, Walsall, West Bromwich, Bilston, and Wednesbury are the chief towns in the Black Country engaged in the iron industry.

Nottinghamshire consists of the low plain of the Trent except in the S.W. There is coal in the west of the county and this has made Nottingham, the county town, and Mansfield centres for cotton hosiery, lace, and net. Newark and Retford are agricultural centres. To the north of Mansfield is Sherwood Forest, the home of Robin Hood.

Leicestershire consists almost entirely of the fertile plain of the Soar, a tributary of the Trent. Charnwood Forest, consisting of worn down ancient rocks, is in this county. Leicestershire is chiefly pastoral, which has led to a leather and boot and shoe industry at Leicester, the county town, and to the making of pies at Melton Mowbray, and of cheese at Stilton. Coal is mined round Ashby-de-la-Zouch, and is used in the mills of Leicester and Loughborough, which make woollen hosiery as well as boots and shoes.

CHAPTER XXII

WALES

Wales is a mountainous country, and, as no valley connects the north with the south, the country has never been united,

and there has never been a capital of the whole principality. The valleys lead to the sea in the west, and to the midland plain in the east. The population is densest in the south, where there are coal and iron ; in the rest of the principality the population is restricted to the valleys. Here, being isolated, many of them still cling to their old language, and, till quite recently, to their picturesque national costume. The Welsh are famed for their love of music and literature, and their religious revivals.

Flintshire is important because of the coalfield along the Dee. Flint, on the Dee estuary, exports coal. Mold sends coal to Chester. Mostyn has lead mines as well as coal mines, while at Holywell lime is made and lead is mined. Rhyl, on the coast, is a popular seaside resort. St. Asaph is the seat of a bishopric.

Denbighshire consists of mountains in the north and an agricultural district in the south. The Dee flows in a beautiful valley across the south of the county, where stands Llangollen. Wrexham and Ruabon are upon a coalfield in the east. Zinc is also mined in the neighbourhood. Colwyn, on the coast near to the estuary of the Conway, is a seaside resort, while higher up the Conway stands the tourist centre of Bettws-y-Coed. Denbigh, the county town and a farming centre, is in the valley of the Clwyd.

Carnarvonshire.—The Snowdon Range runs through the county, terminating in Braich-y-Pwll in the Lleyn Peninsula. Granite is quarried for road metal in some parts, and slate at Llanberis, Penrhyn, and Bethesda. Bethesda slates are exported via Bangor. Carnarvon stands on the Menai Straits and commands the Pass of Llanberis. It is the county town and has an historic castle. Bangor commands the routes across the Menai Straits by the Tubular and Suspension bridges. It has a cathedral and a university college. Conway, with its old castle, stands on the estuary of the river, which is visited by tourists on account of the beauty of its scenery. Llandudno, at the foot of the Great Orme's Head, is a seaside resort.

Merionethshire rises from Cardigan Bay to the Berwyn Mts., near which is L. Bala, drained by the Dee. Slate is quarried at Festiniog, in the north of the county, and exported via Portmadoc. Dolgelly is the centre for Cader Idris and is the county town. Harlech, with its castle, Barmouth, and Aberdovey are small watering-places on the coast.

Montgomeryshire consists of moorland and mountains, on which are reared sheep, the wool of which is used to make flannel at Montgomery, the county town, Welshpool, and Newtown. Lake Verno, in the county, is used to supply Liverpool with water.

Cardiganshire lies along the coast of Cardigan Bay. Lead and zinc are mined, and horses and ponies are reared. Along the coast are a number of small fishing towns of which Cardigan (the county town), at the mouth of the Teifi, is the most important. Lampeter, also on the Teifi, has a theological college. Aberystwyth, in the north of the county, and within easy reach of Plynlimon, is a seaside resort. It has a university college.

Radnorshire is one of the most thinly populated counties in Wales. The only places of any importance are the small towns of Knighton, on the Teme, and Presteign, on a tributary of the Wye.

Brecon is also thinly populated, the surface rising to 2,910 ft. in the Brecon Beacons. The Usk flows across the county, and the Wye along its Radnorshire boundary. Builth stands on the Wye, and Brecon, the county town, on the Usk.

Glamorganshire is the most important Welsh county. Coal and iron are found in the north of the county, where Merthyr Tydvil, Aberdare, and Dowlais are situated. The Taff leads to the great port of Cardiff, which now includes Llandaff, with its cathedral, as a suburb; Barry, to the south, is a rising port. Swansea, to the east of the Gower Peninsula, is a large port, importing copper and tin ore, which is smelted there, and at Neath and Aberdare. That is why the towns on the coalfield in the north of the county specialize in copper and tin-plate. Bridgend is situated in a fertile valley that produces potatoes and wheat.

Carmarthenshire.—The fertile valley of the Towy is the most important part of the county. Carmarthen, at the mouth of the Towy, is a port and the county town. Llanelli exports coal and imports copper ore, which is smelted there. In the north of the county is a waste of moorland.

Pembrokeshire is low and has a mild climate. It is therefore principally a farming county, but coalfields run across the south of it. Milford Haven is an excellent harbour, but there is no large port on it. Milford is a market town. Pembroke, on Milford Haven, does a little Irish trade, but most of this now goes via the rising port of Fishguard, on the coast of Cardigan Bay. Tenby, on Carmarthen Bay, is a thriving seaside resort. St. David's is the seat of a bishopric, and Haverfordwest, which is inland, is a farming centre.

Anglesey differs from the rest of Wales in being low and flat, but it has some fine coast scenery on the west coast. Farming is carried on, but the chief importance of the island lies in its trade with Ireland via Holyhead. Beaumaris, on the Menai St., is the county town.

ISLE OF MAN

The Isle of Man is situated in the midst of the Irish Sea. The island rises to over 2,000 ft. in Snaefell, from the top of which on a clear day the highlands of Ireland, Wales, Cumberland, and Scotland can be seen. Lead is mined, and cattle are reared for the Liverpool market, but the chief industry is fishing. Peel, on the west coast, is the chief fishing centre. Douglas, Ramsey and Port Erin, are sea-side resorts.

QUESTIONS

1. Some of the finest natural harbours in the British Isles have no great ports on them. Give examples and account for the absence of ports.
2. What is the importance of the line joining the Tees and Exe?
3. Compare the surface of Scotland with that of Ireland.
4. Which parts of the British Islands have the greatest rainfall? How do you account for the rainfall being heavy in the districts you mention? What effect has the distribution of rainfall on the distribution of crops and industries?
5. The figures below are the mean annual rainfall for Seathwaite, Princetown, Pembroke, Shoeburyness, Oxford. Place the figure against the place to which it belongs, and give the reasons which have led to your decision.
25 in., 131 in., 40 in., 70 in., 21 in.
6. Which parts of the British Isles produce the most bread (wheat) and which the most butter? Give reasons for the substances being produced in the districts which you mention.
7. In which parts of the British Isles are each of the following crops grown: oats, apples, turnips, hops, and flax? Give reasons for the crops being grown in the particular districts.
8. What grain crops are cultivated in the British Isles? Describe their distribution, and account for it.
9. Name three counties of the British Islands which have (1) the greatest rainfall, (2) the greatest number of sheep to the 1,000 acres, and (3) the largest number of miners. Give the reasons which have led to your selection.
10. Describe the position of the chief English coalfields which are inland. To what use is the coal obtained in each put?
11. Name three important iron-smelting districts and say to what use the pig iron produced is put in each case, and give reasons for it being so used.
12. Distinguish between linen, cottons, and woollens. In what districts are they manufactured, and why?
13. Give two places important for the manufacture of each of the following: pottery, flannel, paper, soap, and leather. Give reasons for the industries being carried on in the places mentioned.
14. Draw a sketch map to show the "ferry" routes between Britain and Ireland. Give an account of the trade of each of the Irish ports.
15. Give an account of the routes between England and Scotland, and show how the direction they take is controlled by the configuration of the land.
16. Say how you would get from each of the following towns to the next by rail: Penzance, Bristol, Liverpool, London, Leeds, Newcastle, Carlisle, and Glasgow.
17. To what modern conditions do Middlesbrough, Barry, Crewe, Coventry, Brighton and Fishguard owe their development?

18. If Ireland lay to the east of England, say how its climate and industrial development would be affected.
19. Write an account of the canals of England, and say what traffic passes along them.
20. Give an account of Yorkshire or Staffordshire under the following heads, surface, climate, agriculture, minerals and industries.
21. Name and locate three large towns outside London and the coalfields, and show what geographical factors have led to their importance.
22. Compare Devon and Norfolk as regards surface, climate, vegetation and industries.
23. Which parts of England and Wales are most thickly populated? How do you account for the population being dense in the districts named?
24. Write a brief description of Glenmore, Bog of Allen, Dartmoor, the Trossachs, and the Weald.
25. Compare the distribution of the population in Ireland and Scotland. Account for the difference.

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